

THE COMMERCIAL CAR JOURNAL

Entered as Second-Class Matter at the Post Office at Philadelphia, Pa.

REPUBLIC

The Recognized Standard One-Ton Commercial Car

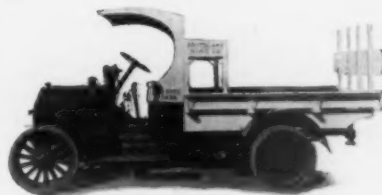


The Republic--
In Furniture Service.

Republic Trucks are now in service with hundreds of progressive business concerns. And every Republic Truck is *making good*—for its owner and for us.

Naturally, the stability of construction in Republic Trucks is the keynote to the wonderful success achieved to date. No motor truck can stand up under the hard stress of

delivery service unless it be made right—and no truck can earn profits for its owner unless it is on the job continually. We now refer to hundreds of Republic users who will back up our claims for superiority in Commercial cars of one ton capacity.



The Republic--
In Wine and Ale Service.



The Republic--
In Bus Service.

Dealers:—

78 live, money-making dealers are now *selling* Republic Trucks—“selling them, not handling them.” Increased production (a natural business procedure, due to demand) enables us to make more dealer connections for 1915. We want you and we believe you want the



The Republic--
In Transfer and Express Service.

Republic. It sells for \$1350.00 (Chassis) and our dealer terms are liberal, backed up by Sales Co-operation that wins.

A Suggestion:—Write us now and if your territory is open, you will have first chance to get in this family of successful Republic dealers, and that means profit.

ALMA MOTOR TRUCK COMPANY

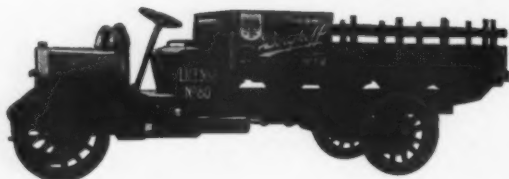
Factories:
Alma, Michigan
General Sales Office:
880 Woodward Ave., Detroit, Michigan



One-Ton
Motor Trucks

Standard Highland Bodies

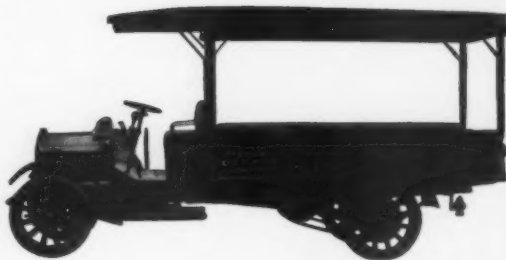
For Motor Trucks



Our production facilities are so ample and complete that you can not only procure the most desirable body in the quickest time and at the lowest cost, but the wide range of types enables the car builder to procure from this line the right body for every business. We make 38 sizes of Flare Board and 27 sizes of Stake Bodies in addition to Furniture and various other types of bodies.

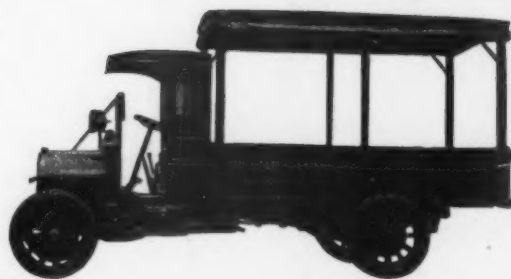
We have full line of standardized Panel and Express Bodies for 1,000 pound and 1,500 pound Delivery Cars

**For Economy, Service
and Durability, Get
Highland Bodies**



Highland Bodies are standard for motor trucks because they have proved to be the best from the standpoints of efficiency and durability; because they are made, not by wagon builders, but by engineers who know the severe service motor truck bodies must withstand and design accordingly;

because by standardization we have not only made better bodies, but reduced the cost below those distinctly inferior; because they have proved superior from every practical standpoint.



Our Catalogue and Price List Should Be With You Always

The Highland Body Mfg. Co.
Cincinnati Ohio

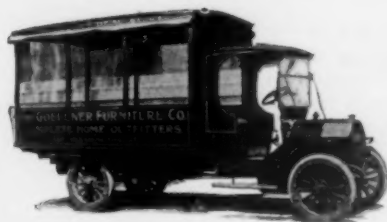
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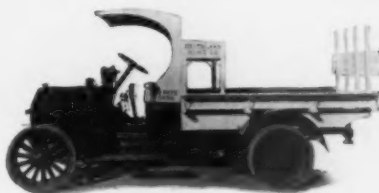


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ALMA MOTOR TRUCK COMPANY

Factories:
Alma, Michigan

General Sales Office:
880 Woodward Ave., Detroit, Michigan



One-Ton
Motor Trucks

Are You a Leader or a Trailer?



There is nothing that so signally stamps a business house as progressive and wide-awake as the ownership of a fleet of strong, speedy motor trucks. And what is there that so plainly spells "behind the times" as horse hauling?

In every line of business, the Reo two-ton truck, Model J, has converted the leading firms to the new gospel of efficient delivery. Right from the start the Model J caught the attention of keen business men as a truck of great possibilities, and the demand has forced the great Reo factory to break production records over and over again.

Ten foreign countries now know the Reo, while in America, from Maine to California, the name "Reo" is synonymous with "dependability."

It has won the approval of men wherever material is hauled and goods delivered, not only because of its low cost, \$1650 for chassis with driver's cab, but because it has so many essentially modern and progressive features not found in other motor

trucks, such as Reo Sectional Radiator of 24 separate interchangeable units, which may be repaired on the road any where; motor, clutch and transmission cushioned on a subframe, away from jars and road-shocks; left-side drive, and the best and handiest center control ever brought out; big armored front frame; demountable driver's cab; gas headlights and Prest-O-Lite tank, and many other details of design and construction that mark the utmost advance in modern engineering practice.

These features mean sure, unbroken service, low upkeep cost, and that wide margin of safety that a motor truck must have to meet the frequent emergencies of extra service, bad roads and overloading, that cannot be otherwise forestalled.

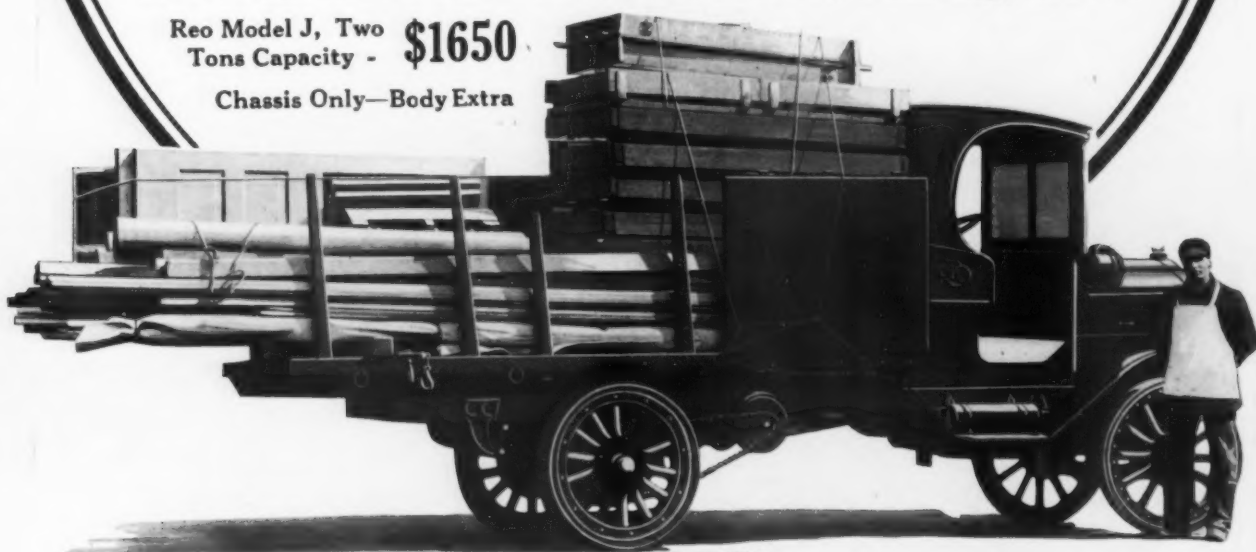
Write for the Reo Truck Catalog

Be a leader and enjoy the profits and prestige that go to the man who keeps ahead of the procession. If you are a dealer in motor-driven vehicles, investigate the opportunity the Reo Truck offers you to supply an increasing demand.

REO MOTOR TRUCK COMPANY, Lansing, Mich.

Reo Model J, Two Tons Capacity - **\$1650**

Chassis Only—Body Extra



When Writing, Please Say—"Saw Your Ad. in the C C J"



THE PUBLISHERS' PERSONAL PAGE



"The most important element in success is economy—economy of money and time."

In New York City attempts are being made to equalize the charges for ferriage, so that motor-driven vehicles will not be discriminated against. At the present time many of the rates give an unfair advantage to horse-drawn vehicles; for instance, a 15 ft. automobile truck is charged the same as a 40 ft. diameter truck, 50 ft. over all, counting the horse; a 29 ft. truck, empty, is charged more than a 60 ft. diameter one-horse truck, occupying a space fully 70 ft. long. Numerous such instances are noted.

New York Ferries Discriminate Against Trucks

If any difference exists in rates it should be in favor of motor-driven vehicles; which occupy less space for their load, move quicker, do not congest the traffic, require no winches to pull them up inclines at low tide, do not deteriorate the planking of decks, make no dirt, are shod with rubber instead of steel, cannot be frightened in cases of boat collision, causing an accident. Their brakes are better and they stay put when once placed. No men are required to clean up after them.

Trucks Less Destructive Than Horses

Ferry boats, not only in their charges, but in their arrangement, have not yet accommodated themselves to modern traffic conditions. The extra charge for motor-

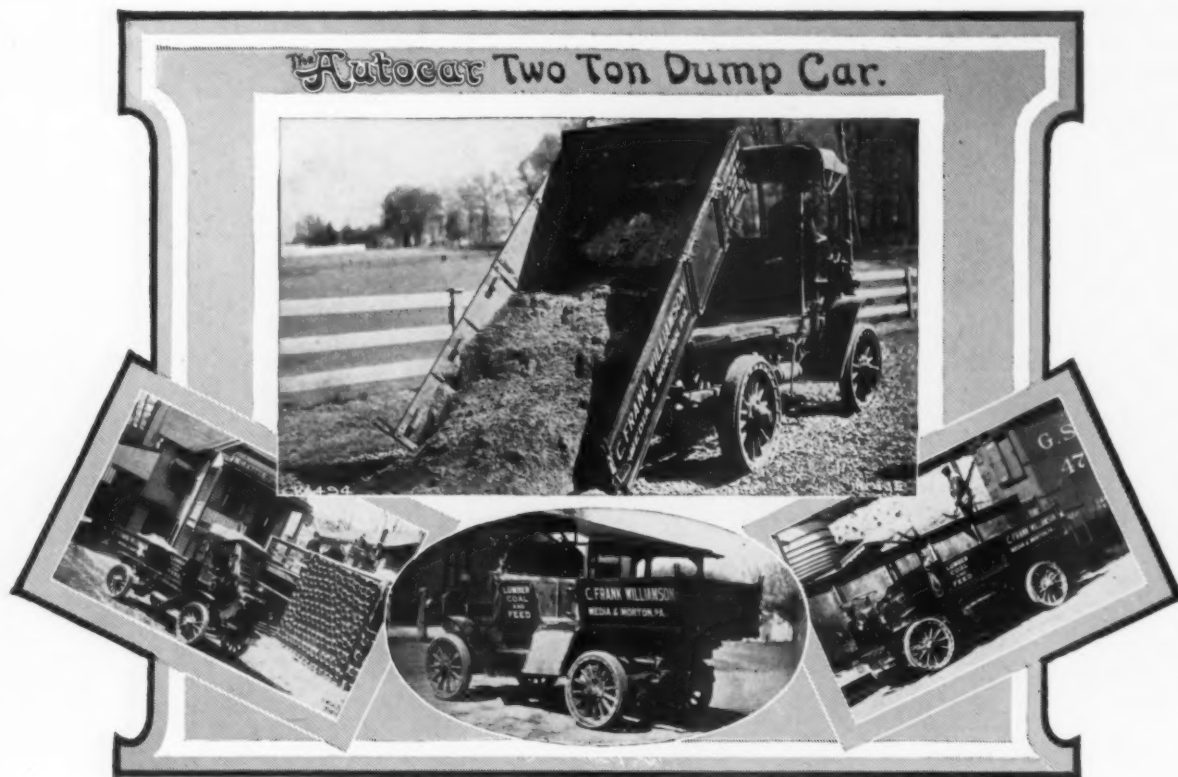
Fire Risk Does Not Exist

driven apparatus is because of its newness, and a fancied fire risk which does not exist. The New York records show that no fires have occurred due to motor-driven trucks being carried by the ferries.

This is but one of the numerous matters which can and should be cared for by the truck dealers, and requires organization and affiliation with dealers in other cities. Truck interests in all sections should follow the suit of those in New York, wherever ferry tolls show discriminations.

A Work for Dealers' Associations

This Autocar Hauled 80 Tons of Crushed Stone in 2 Days



2 Ton Combination Contractor's Coal, Feed and Lumber Car, fills long felt demand for general utility Vehicle

The new "general utility" AUTOCAR, with dumping body, has met with quick response from contractors, flour and feed merchants, coal dealers and other concerns in city and suburbs. Its ability to cover wide territory, its adaptability for average country roads and its simplicity of operation make it of extraordinary value for a variety of hauling purposes.

C. Frank Williamson, of Media, Pa., dealer in lumber, coal and feed, uses the AUTOCAR to advantage for quick deliveries and finds it a surprising business builder. Recently he hauled 80 tons of crushed stone from two 40-ton freight cars on a Media siding to the grounds of the Rose Tree Hunt Club, a mile and a half away. The distance was not great, but the fact that the AUTOCAR *completed this work in two days* shows its possibilities for quick hauling. It would have taken six horses to have finished the work in that space of time.

In the above view of the combination coal, feed, lumber and dump car, the side stakes used in hauling lumber are not shown. The car is furnished with side and tail gate.

The AUTOCAR'S well-known freedom from operating expenses and its reasonable investment costs make it unquestionably cheaper to buy and operate than horse equipment. This has been the experience of hundreds of concerns in every line of business.

It places you under no obligation to be informed, while the use of an AUTOCAR will mean bigger business to you and a daily saving.

Address, Department "J", for new catalog.

THE AUTOCAR COMPANY

Established 1897

MOTOR DELIVERY CAR SPECIALISTS

ARDMORE, PA.

When Writing, Please Say—"Saw Your Ad. in the C C J"

The Commercial Car Journal

VOLUME VII

PHILADELPHIA, JULY 15, 1914

NUMBER 5

N. A. C. C. CONVENTION DURING OCTOBER

National Automobile Chamber of Commerce recently announced that a convention of motor truck manufacturers would be held some time during October. The exact date and the location have not been decided upon, but it is thought that the convention will be held in New York City. The real purpose of the convention is to secure concerted action, on the part of the manufacturers, in rectifying certain bad features now existing in the sales end of the business, while the ostensible reason is to help along the good work being done to advance the cause of the commercial motor vehicle.

DUNNAGE ALLOWANCES DISAPPROVED BY INTERSTATE COMMERCE COMMISSION

The Interstate Commerce Commission has rendered its decision disapproving dunnage allowances, the particular territory involved in this case being the Southwest. Railroads in that territory issued a tariff cancelling the allowance of 500 lbs. for dunnage on shipments of articles in closed cars. The National Automobile Chamber of Commerce and manufacturers of other articles protested and the cancellation was suspended by the Commission, but will now be permitted to take effect.

M. T. C. ESTABLISHES LEGAL AID BUREAU

The Motor Truck Club of New York has planned a legal aid bureau for its members. This will cover instruction in legal matters and representation in court.

"The plan to establish a school of instruction is the result of a suggestion from one of the magistrates. Many of the cases brought into court are the result of a lack of knowledge on the part of the defendant of the laws, ordinances and regulations, and it is expected that by conducting such a school the number of cases of violation can be reduced, thus affecting a saving of time and money. This school could be conducted at night and the work will be in the form of lectures and written and printed instructions."

THE NATIONAL AUTOMOBILE CHAMBER OF COMMERCE has issued a circular showing how automobile engine parts should be billed when shipped to and from points west of Chicago, to insure the proper freight rates being applied by the railroads. Metal parts, which are not otherwise specialized in the Western Classification, are rated as first-class in less than car-load lots, whereas metal parts of the engine, which are not otherwise specifically rated, come under the general heading of machinery parts, knocked down, in boxes, bundles or crates, and take second-class freight rates. Engine parts, not specifically rated, can secure the second-class rating, by being packed separately from other parts and being billed as "Gasoline Engine Parts," whereas if billed as "Automobile Metal Parts" they will take first-class freight rates.

Table of Contents

	PAGE
Advertisers' Index	95
Activities of the Electric Vehicle Association of America	39
Are Present Methods of Transport the Best?—By Our Foreign Correspondent	31
Care and Repair of Truck Radiators—By Murray Fahnestock	27
Conventions of Interest to the Trade	6
Croce Commercial Cars	26
Editorials	7
From Across the Water	31
In the World of the Electric	39
Information Bureau and Correspondence	9
Krebs One-and-a-Half-Tonner Has Worm Drive	19
Mogul Adds a Two-Tonner	24
Motor Truck Design and Construction Made Plain—By C. T. Schaefer	28
New Design One and a Half Ton DeKalb Truck	22
New York Wireless Truck Tire Service Station of the B. F. Goodrich Company	50
Personal Items	5
S.A.E. Summer Meeting—Cape May	42
Service, From the Standpoint of the Commercial Delivery Man and User of Motor Trucks—By Wayne W. Light	37
The Fremont-Mais One and a Half Ton Truck—By Hugh Dolnar	20
The Military Motor on Peace and War Footing—By Our Foreign Correspondent	53
The New Aetna Two-Ton Worm-Drive Truck	25
The Stewart Motor Corporation's New Fifteen Hundred Pound Capacity Series No. 2 Commercial Cars—By George W. Grupp	17
The Truth About Trucks in the Service of Uncle Sam, for War Purposes	11
Truck Accessories and Appliances	35
What the Bush Terminal is Doing With Its Battery Truck Cranes	49

PACKARD DOES GOOD BUSINESS

The Packard Motor Car Company announces that the sales of Packard trucks to users during the month of June totaled \$825,394. This is exclusive of bodies. Not only is this total remarkable in the face of prevalent business conditions, but it culminates four months of record-breaking truck sales.

In March, the Packard Company sold more than \$750,000 worth of trucks. In April, the business total was 60 per cent. greater than in April, 1913, while the May total was also 60 per cent. greater than in the corresponding month last year.

The June sales exceed those of June, 1913, by \$256,994, an increase of nearly 50 per cent.

The largest individual order received during June was one for twelve Packard three-ton trucks from the Marshall Field Company, Chicago. This firm has purchased a total of thirty-three Packard heavy duty trucks and several rebuilt motor carriage chassis for light delivery work. The June sales of Packard trucks were received from every section of the country. The East was as strongly represented as the far West and Middle West.

BIG REPUBLIC ORDER FOR AUSTRALIA

The Alma Motor Truck Company, of Alma, Mich., has recently made a big showing in its export department by selling twenty Republic trucks to Eyes & Crowle, Adelaide, Australia, truck dealers at that point.

New Incorporations

Miller & Van Winkle, Brooklyn, N. Y., has been incorporated for the purpose of manufacturing automobile springs and accessories. The capital stock of the company is \$150,000.

Balon Steel Company's plant at Charleston, W. Va., has been purchased by the Becker Steel Company, importer of German cobalt steel, at 90 West Street, New York City. A new company is being incorporated, with a capitalization of \$1,000,000, for the purpose of shipping billets from Germany and making various sizes and shapes for immediate delivery in this country.

J. B. Davis is at the head of a million-dollar company in New Orleans, La., that will manufacture cars of all descriptions, from runabouts to limousines and trucks. A factory will be built as soon as 20 per cent. of the stock has been sold; a repairing and rebuilding plant will also be part of the enterprise. The following officers have been elected: J. Bart Davis, president; A. C. Vreeland, vice-president, and J. Markl, Jr., secretary.

Haney Rescue Apparatus Company, Tampa, Fla., has been incorporated with a capitalization of \$2,000,000 to build the Haney fire and rescue apparatus and motor trucks for the conveyance of the apparatus. The officers are as follows: E. H. Haney, president; T. M. Wier, vice-president; F. M. Williams, second vice-president; R. C. Stubbins, treasurer and Samuel Borchardt, secretary and general counsel. The truck has a loading space of 12 ft. in length, being large enough for the apparatus and 6 firemen. It has a six-cylinder, 45-h.p. modern engine, and can make a speed of 40 m.p.h.

Wilson Foundry & Machine Company, incorporated with a capitalization of \$400,000, has chosen Pontiac, Mich., as its location. The new company will engage in a general gray iron foundry business, and will specialize on automobile cylinder castings. The officers of the company are: C. B. Wilson, president; D. R. Wilson, vice-president and sales manager, and C. E. Killinger, secretary and treasurer. The Wilson brothers have surrounded themselves with men experienced in the special work being done, and A. Weber has been chosen as foundry superintendent, Wm. Short, chemist, and C. Fleming, master mechanic.

Pontiac Drop Forge Company, Pontiac, Mich., has been formed with a capitalization of \$112,500, to take over the plant formerly occupied by the forging department of the Flanders' Manufacturing Company. The officers of the new company are: M. Rothchild, president; E. P. Waldron, vice-president; A. G. Griggs, secretary, and D. C. McCord, treasurer and general manager. These officers, together with F. H. Carrol, compose the Board of Directors. J. M. Grieve, well known to the forging trade, has been appointed production manager. The plant is equipped to forge any and all kinds of carbon, alloyed steel and copper forgings, with a separate heat-treating and carbonizing department.

W. A. ZIMMERMAN HEADS SALES AND ADVERTISING OF BUFFALO ELECTRIC VEHICLE COMPANY

W. A. Zimmerman, well known in the commercial car industry as the advertising manager of the Mercury Manufacturing Company, of Chicago, Ill., has recently accepted the position of general sales and advertising manager of the Buffalo Electric Vehicle Company, of Buffalo, N. Y. This firm will manufacture high-grade electric pleasure cars and 1500-lb. and 2000-lb. electric trucks. Nineteen hundred and fifteen announcements will soon be made.

Associated with Mr. Zimmerman in the sales department will be Frank C. Brown, formerly New England distributor for the Chase Motor Truck Company. Mr. Brown will have charge of the truck sales department.

NEW ROTTMEILER \$785 THOUSAND POUND WORM-DRIVE TRUCK

George O. Rottmeiler has resigned as vice-president and general manager of the Crown Commercial Car Company and will shortly place on the market a thousand-pound worm-driven truck, complete, with express body fully equipped at \$785. There will be but one chassis built and one style of body at this price. Other special bodies will be furnished at extra cost. The first lot of these will be 1000. Mr. Rottmeiler has opened offices at 1809 Peoples' Gas Building, Chicago, Ill., and is now looking for a suitable factory site where operations can be started within the next ninety days. We anticipate describing this new truck in our next issue.

BROWN-LIPE-CHAPIN COMPANY BUYS M. & S. DIFFERENTIAL

The Brown-Lipe-Chapin Company, of Syracuse, N. Y., has just entered into an agreement with the M. & S. Gear Company, of Kansas City, Mo., whereby the Syracuse Company has secured the American manufacturing rights of the M. & S. Differential exclusively for the general trade.

The Electric Vehicle Association, at its fifth annual convention, to be held in Philadelphia, Monday, Tuesday and Wednesday, October 19th, 20th and 21st, will have a very complete exhibit of electric vehicles, batteries and accessories, which exhibit will form a special section of the Philadelphia Electric Show, to be held October 19th to 24th. Further particulars will be gladly given upon application to the Executive Secretary, 29 West Thirty-ninth Street, New York City.

General Motors Truck Company has just issued a statement showing a substantial growth in its business during the past six months. June business for this year exceeded that of June, 1913, by 17 per cent.; the increase for May was 36 per cent., and for April, 20 per cent. The sales of last month exceeded those of May, 1914, by 9 per cent., and May sales exceeded those of April, 1914, by 17 per cent.

Factory Items and Changes

Service Motor Car Company, Indianapolis, Ind., has changed its name to Service Motor Truck Company.

Swiss Magneto Company has moved its general offices from 3027 Wabash Avenue, Chicago, Ill., to 3021 Michigan Avenue.

Standard Motor Company, Warren, Ohio, manufacturer of the Standard motor truck, will enlarge its plant at the cost of \$15,000.

Four-Wheel Drive Truck Company, 316 East Pike Street, Seattle, Wash., has enlarged its quarters by taking 314 East Pike Street.

Kalamazoo Motor Vehicle Company, Kalamazoo, Mich., is building a 30-h.p. 3000-lb. truck, of which twenty-five are to be built this year.

Stroud, Bridge & Connors, Bay City, Mich., are planning a two-story factory, 90x110 ft., which will be used for the manufacture of automobile accessories.

Peerless Motor Car Company, of Cleveland, Ohio, is to make a line of four-wheel tractors for use in hauling trailers, as well as carrying small loads themselves.

Kelly-Springfield Tire Company, of New York City, is now occupying its new solid tire service department building at 553-55 West Fifty-seventh Street, where the company will conduct all its solid tire work in that city.

Buick Motor Company, Flint, Mich., is erecting a three-story, fireproof building for enamel plant. The structure will be 108x265 ft., and will be one of the most complete factory buildings in the world. The work is scheduled for completion on October 1st.

Michigan Electric Welding Company, Detroit, Mich., has recently completed a 4017-ft. addition to its plant, making an increase of 8070 ft. within the year. The company manufactures automobile parts and does butt and spot job welding. Drag links and brake rod assemblies are specialties.

United States Truck Company, 213 Webster Street, Cincinnati, Ohio, has merged with the Stewart Motor Truck Company, which is operating at the plant of the Stewart Iron Works, of the same city, and will move its plant to the Covington (Ky.) factory of the Stewart Iron Works, but will retain its name.

Baker Drop Forge Company, Jackson, Mich., has consolidated with the Frost Gear & Forge Company, although the formal transfer of the business will not take place until August 1st. In the meantime the Frost Gear & Forge Company has assumed the debts of the Baker Drop Forge Company on the basis of appraisal made on January 1, 1914, which showed its liabilities to be \$120,000 and its assets about \$205,000.

The Truck Traders, Inc., New York City, has been formed for the purpose of dealing with used motor trucks. The trucks will be rebuilt before they are offered for sale.

Personal Items

A. J. Pitts has been appointed general sales manager of the Wagenhals Motor Truck Company, of Detroit.

G. K. MacEdward, advertising manager of the Detroit Lubricator Company, of Detroit, Mich., has resigned to join the advertising department of the Chalmers Motor Company.

F. C. Brown, formerly district manager for the Chase Motor Truck Company, has been made sales manager of the Truck Department of the Buffalo Electric Vehicle Company.

L. C. Erbes, 1479 Minnehaha Avenue, St. Paul, Minn., who recently purchased the Dilver Manufacturing plant, at 2654 University Avenue, is to manufacture commercial cars in addition to Bob Burman's racing car.

Vincent Link, who was for some time associated with the Universal Motor Truck Company, of Detroit, Mich., and who resigned to take up other work, is again connected with the Universal forces in the capacity of chief engineer.

A. I. Butler, formerly manager of the Goodyear Tire & Rubber Company, of Brooklyn, N. Y., is now associated with the Batavia Rubber Company, of New York, in the capacity of special representative, having charge of the northern New York territory.

Francis S. Duff has accepted the position of manager of the motor truck department of the Cartercar Sales Company, of Washington, D. C. This company has been appointed distributor in this territory for the Service motor truck, manufactured at Wabash, Ind.

Roy E. Marcotte, for the past two years in charge of the advertising of the Canadian plant of the Studebaker Corporation, with offices in Walkerville, Can., is now in the Detroit offices. He will continue handling the Canadian advertising and will assist in the publicity work at the Detroit plant.

E. L. Schumacher, new traffic engineer of the Federal Motor Truck Company, has been sent into the field for investigation and compiling of valuable data. His work, as traffic expert, will be the gathering of data on the actual hauling work of concerns in various trades. He will begin his work in Indianapolis on the bus and transfer lines of that city, working principally with concerns who use horse equipment, but also with those having trucks.

T. W. Warner, of the Warner Manufacturing Company, Toledo, Ohio, who has been president and general manager of the Muncie Gear Works, Muncie, Ind., for the past six or eight months, has turned over the management of the latter company to Dr. W. A. Spurgeon, formerly vice-president, who has been elected president. The six months management of T. W. Warner has placed the Muncie Gear Works in a much improved condition. Mr. Warner will now devote his undivided attention to his own company.

Agency and Branch Items

Kelly Motor Truck Company has moved to Van Ness Avenue, near Turk Street, Los Angeles, Cal.

Kelly-Springfield Truck Agency, 3333 Olive Street, St. Louis, Mo., has moved to 3426 Lindell Boulevard.

Z. C. Elkin has been appointed manager of the Chicago branch of the General Motors Truck Company.

Hardy, W. A., Seattle, Wash., has secured the Washington state distributing agency for the Wilcox truck.

Model Automobile Company, 2 E. North Avenue, Baltimore, Md., has taken the agency for the Bessemer trucks.

Firestone Tire & Rubber Company, of Akron, Ohio, has moved its Cincinnati branch to a new building at 213-15 East Eighth Street.

W. B. Hovendon, for some time past connected with the Washington (D. C.) Firestone branch, has joined the sales force of the Goodyear Tire & Rubber Company, of that city.

W. S. Mears, recently New Jersey distributor of the Nyberg car, and formerly with the Garford Company, is now with the Knox Motors Company, in charge of New Jersey territory.

Ijams, Albert B., distributor of Federal motor trucks in Maryland, Virginia and the District of Columbia, has taken new quarters at McKenna's Garage, 803-7 Low Street, Baltimore, Md.

Claypool Garage, Capitol Avenue, Indianapolis, Ind., has been taken over by S. K. Bromley and Wm. H. Wilson. Besides the regular garage business, they will deal in pleasure cars and trucks.

F. P. Gertzen, manager for the Wilcox Trux Company, St. Louis, Mo., has resigned on account of ill-health. A. K. Haines, of the Cyclecar Sales Company, is temporarily handling Wilcox affairs.

Frederick E. Hole, formerly manager of the Memphis branch of the H. E. Wilcox Motor Car Company, of Minneapolis, Minn., has been appointed manager of the St. Louis branch in the place of J. P. Gertsen, who has resigned on account of ill-health.

DENBY MOTOR TRUCK COMPANY —NEW DETROIT CONCERN

The Denby Motor Truck Company has started business in Detroit, with offices at 2036 Dime Bank Bldg., and factory at Dubois and Franklin Streets. Contracts have been placed for parts for 500 trucks for the first year, with an increase to 1000 trucks as the business develops. The truck is to be in 1500-lb. to one-ton class.

The officers are as follows: Garvin Denby, president and general manager; J. Walter Drake, vice-president; Arthur Webster, secretary; L. C. Freeman, engineer; R. B. Spencer, sales manager; R. P. Moore, advertising manager; E. L. Schumacher, efficiency engineer; M. E. McKenney, assistant sales manager, and H. L. Constant, secretary to the president.

PHILADELPHIA MOTOR TRUCK ASSOCIATION HOLDS MEETING



AT a meeting of the Motor Truck Association of Philadelphia, held on June 17th, at the Adelphia Hotel, W. H. Metcalf, of The Bartlett Garages, Inc., acted as chairman in the absence of the president, E. B. Jackson, of the Packard Motor Car Company. Representatives were present from all of the motor truck salesrooms in Philadelphia. Each of the tire companies had a representative present. At this meeting, the motor truck body builders had been invited to attend and there was a representative from all of the larger body-building houses in Philadelphia and vicinity.

Lieutenant William D. Mills, of the local traffic squad, gave an excellent address on the traffic situation in Philadelphia, which was greatly appreciated by the men present. Extracts of his paper follow:

TRAFFIC REGULATION

By **LIEUTENANT WILLIAM D. MILLS**, of the Philadelphia Traffic Squad

The regulation of street traffic should be considered first from the point of safety for the pedestrian, second, with a view to keeping highways free from obstruction and congestion, so as to provide for rapid and safe transportation, and third, so that persons conducting business should be unhampered by unnecessary congestion or interference in loading or delivery of merchandise.

Safety for pedestrians calls for careful and competent operation of vehicles or automobiles by the drivers, alertness of the pedestrian, and, in congested centers, reasonable and safe traffic regulations and efficient traffic officers. If sustained by higher authority, the recent ruling of Judge Sulzberger, in which he states that ancient right of the people to cross a city street at any point must be qualified by the doctrine that between crossings, the right of way belongs to the vehicle, will make it necessary for the police department to change some of its traffic rules and to adopt more drastic regulations in the congested district. Wobbly, erratic driving of motor vehicles by careless or incompetent operators, particularly noticeable and dangerous on approaching intersecting streets, making it impossible for pedestrians to determine the probable direction of the vehicle, has caused the police department to seriously consider the marking out of definite tracks on the street surface and compelling all vehicular traffic to cross intersecting streets within these marked tracks. Vehicles circling City Hall would be compelled to travel in well-defined tracks. Those turning into side streets will also be compelled to follow a definite marked arc. Pedestrians will then be able to ascertain the course of an approaching vehicle.

The impossibility of traffic patrolmen and pedestrians to ascertain the probable direction of vehicles traveling on Market and Broad Streets and the frequent desire of drivers to turn south from the north side of Market Street into a street where the direction of traffic is north, or vice-versa, has led the department to seriously consider the elimination of this long turn and the compulsion of vehicles desiring to turn from one street into another to make the short turn. This will make impossible the approach of a vehicle obscured by other

traffic, however congested it may be, and will make a uniform turn to the right.

No doubt exists that a large percentage of accidents or collisions are due to incompetent, untrained or careless drivers. The guiding of a high powered motor through the congested portion of the city especially calls for skill and ability and leaves no opportunity for conversing with someone seated alongside, or skylarking with persons on sidewalks, or upon passing vehicles. Unnecessary tooting of horns and improper use of cut-out at crossings in order to cause pedestrians to jump in alarm, not only causes ill feeling toward motorists in general, but leaves in many instances a nervous and apprehensive pedestrian for some other driver to contend with at the next crossing.

The only safeguard that operators of motor vehicles have to prevent more drastic regulation would seem to be a co-operative movement on the part of employer and employee to remedy conditions of this kind.

Rapidly increasing congestion of both pedestrians and vehicles, considered from points of speed and safety, would seem to indicate in the near future the possibility of two surfaces at congested intersections, one for pedestrians and one for vehicles.

Street Congestion—Parked Cars

Regulation of traffic from the standpoint of safety would seem to call only for co-operation between pedestrian and driver assisted by reasonable regulations.

The problem of ultimate street congestion caused by the parked car, motor trucks and teams, loading and unloading merchandise, is one which is puzzling city officials all over the country. The police department is in daily receipt of queries from officials of other cities asking how we are meeting the problem and our plan

for the future. The opinion of some authorities was that the substitution of the motor for the horse and consequent larger vehicle and more rapid transportation would remedy this condition but it has not; it seems to me to call for regulation that will take the parked car from the streets in the congested centers, allowing the entire street surface for moving vehicles and those engaged in the actual loading and unloading of merchandise, or persons. Regulation along this line however, calls for careful study so that the rights of all parties concerned will not be interfered with.

In the discussion which resulted, the fact was brought out that a new electrical signalling device to assist traffic policemen is now being tested by the Philadelphia police, and it is expected will soon be adopted and installed at the most congested crossings. By pressing the button the traffic policeman controls signals at the four corners of the street. These are fitted at night with colored lights. The statement was made by Lieutenant Mills that four other cities were favorably considering the same device. This is said to be an invention by one of the Philadelphia traffic policemen.

E. J. Cattell, the city statistician and well-known Philadelphia orator, aroused great enthusiasm among the men by his facts and figures of the enormous manufacturing industries in Philadelphia.

Mr. Cattell was followed by E. S. Foljambe, representative of the COMMERCIAL CAR JOURNAL, who gave a very interesting talk on the motor delivery vehicle situation.

A number of new members were taken into the association. E. M. Bartlett, of the

Stanley Motor Carriage Company, was appointed chairman of the Publicity Committee, and Emlen S. Hare, of the Commercial Truck Company, was appointed chairman of the Entertainment Committee. W. Ross Walton was elected chairman of the Admission Committee.

The members of the Motor Truck Association are enthusiastic over their progress and the active work that is being done by the association. There were sixty-nine representative men of the motor truck industry at this meeting.

Westinghouse Electric & Manufacturing Company, of East Pittsburgh, Pa., recently installed in the garage of the Curtis Publishing Company, of Philadelphia, one of its electric vehicle battery charging outfits. One of the most interesting features of the equipment and a striking point of advantage is the arrangement made to keep exact records of the energy used by the different cars.

Linde Air Products Company, of Cleveland, Ohio, has brought suit against the Acetylene Welding Company, of New York City, claiming that its patents 831,078 and 866,866 have been infringed. The patents issued to Felix Jottrand, on August 22, 1905, and September 15, 1906, respectively, cover certain arrangements in an apparatus designed for the production of intense local heat, particularly for the cutting of metal bars and steel plates. The Linde Company claims that the use of a similar apparatus for the production of an intense heat for welding purposes is an infringement of its patents and asks for an injunction, cost and damages.

Conventions of Interest to the Trade

National Conventions

- July 7-9—at New York City. Annual Convention of National Leather and Shoe Finders' Association. Merchants' Association will probably prepare for the event.
- August—at Boston, Mass. National Convention of Florists. Chamber of Commerce may be addressed.
- August 17-22—at Milwaukee, Wis. National Retail Monument Dealers' Association Convention. Address, A. Rathmann.
- October—Louisville, Ky. National Convention of the Kentucky Bottlers' Association to be held in the Armory. Samuel Leidigh is President of both the State and National Associations.
- December 14-17—at Chicago, Ill. American Road Builders' Association. E. L. Powers, 150 Nassau street, New York City, Secretary.

State Conventions and Fairs

- August 4-6—at Newark Valley, N. Y. Northern Tioga Agricultural Society Annual Fair.
- August 11-14—at Fulton, N. Y. Oswego County Agricultural Society.
- August 11-14—at Eldon, Ia. Big Four Fair Association will hold fair.
- August 20-25—at St. Joseph, Mo. Interstate Fair and Stock Show. H. L. Cook is Secretary-Manager.
- August 31-Sept. 5—at Santa Rosa, Cal. District Agricultural Fair to be held. Directors of the Chamber of Commerce are preparing for event.
- August 31—at Syracuse, N. Y. New York State Fair.
- September 1-4—at Owego, N. Y. Tioga Agricultural Society Annual County Fair.
- September 1-5—at Rockingham, Me. Fair under auspices of Rockingham Fair Company. Chester I. Campbell, Manager.
- September 2-4—at Williston, N. D. Williams County Agricultural Fair Association. John Bruegger is President and J. A. Cunningham, Secretary.
- September 2-7—at Grand Rapids, Mich. Greater Michigan Fair.
- September 7-18—at Detroit, Mich. Michigan State Fair.
- September 8-12—at Watkins, N. Y. County Fair, Schuyler County Agricultural Society.

The list of conventions given herewith is published each month so that commercial car manufacturers can communicate with the proper authorities with the idea of arranging to give lectures, illustrated talks, statistics, etc., to show the advantage of motor trucks in these various lines; also possibly to show and demonstrate their cars.

- September 15-18—at Allison, Ia. Butler County Agricultural Association will hold annual fair.
- September 15-18—at Milton, Ia. Milton District Agricultural Association Fair.
- September 16-19—at Batavia, N. Y. Genesee County Fair to be held.
- September 21-26—at Decatur, Ala. North Alabama Fair to be held. James H. Stone, of New Decatur, is Secretary of the organization.
- September 21-26—at Sioux City, Ia. Fair of the Interstate Fair Association.
- September 22-25—at Rhodes, Ia. Eden District Agricultural Association Annual Fair.
- September 22-October 3—at Oklahoma City, Okla. State Fair and Exposition.
- October 1-3—at Oakland, Md. Garrett County Agricultural Association Second Annual Fair.
- October 12-17—at Birmingham, Ala. Alabama State Fair to be held. Sam Fowlkes, Secretary of the Alabama Fair Association, is preparing for event.
- October 13-16—at Athens, Ala. Limestone County Fair Association. Ernest Nine, Secretary.
- October 13-16—at Harrisonburg, Va. Rockingham County Fair. Extensive arrangements are being made.
- October 19-24—at Salisbury, N. C. People's Agricultural Fair Association. W. M. James, Secretary.
- October 20-24—at Hope, Ark. Hempstead County Fair. W. W. Thorp, Secretary.
- October 20-24—at South Boston, Va. Halifax County Fair. W. W. Wilkins, Secretary.
- October 27-30—at Thomson, Ga. McDuffie County Fair Association. Ira E. Farmer, President.

- November 2-7—at Orange, Tex. Orange County Fair Association. Secretary L'Hommedieu, is preparing for the event.
- November 4-11—Louisiana State Fair.
- November 4-14—at Mobile, Ala. The Gulf Coast Fair. Mort L. Bixier, Secretary.
- November 7-13—at Macon, Ga. Georgia State Fair. Harry C. Robert is Secretary and general manager.
- December 1-4—at Des Moines, Ia. Convention of Iowa Retail Implement and Vehicle Dealers' Association. Commercial Club is interested.
- December—at Rochester, N. Y. New York State Dairymen's Association. W. E. Griffith, of Madrid, Secretary.

Firemen's Conventions

- July 21-24—at Maquoketa, Ia. Iowa State Firemen's Association. E. E. Parsons, of Marion, Secretary.
- July 28-29—at Bath, N. Y. Western New York Volunteer Firemen's Association. Charles Kandle, of Lockport, Secretary.
- July 29-31—at Chambersburg, Pa. Cumberland Valley Volunteer Firemen's Association. Chambersburg fire department has charge of preparations.
- August 4-6—at Mansfield, Ohio. Firemen's Association and Ohio Police Association. Chamber of Commerce may be addressed.
- August 10-14—at Connelville, Pa. Western Pennsylvania State Fireman's Association. Convention and Tournament. W. H. Sharah, of Braddock, Secretary.
- August 19-21—at Geneva, N. Y. State Firemen's Association. Thomas Honohan, of Frankfort, Secretary.
- August 26-27—at Greenwich, Conn. State Firemen's Association. Local fire department preparing for event.
- September 23-25—35th Convention of State Firemen's Association. Address local fire department.
- October—at Harrisburg, Pa. State Firemen's Convention. George S. Kroll, of York, State President.
- October 20-23—at New Orleans, La. International Fire Chiefs' Association to convene. Chief Louis Pujol preparing for event.

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SECOND-HAND TRUCK NOW A PROBLEM. DEALERS' ASSOCIATIONS CAN HELP. CO-OPERATIVE APPRAISAL AND SALE SUGGESTED



THE commercial car industry is already suffering from a difficulty which sometime ago confronted the pleasure car end of the automobile business, namely the second-hand car problem. Up to approximately two years ago the second-hand truck did not constitute a problem. To-day it does.

It is a problem not so much in itself, as because the individual commercial car dealer does not treat it properly, and his mistreatment of the second-hand truck proposition makes it a problem for the industry. There are many reasons why a dealer takes in a second-hand truck at an allowance which is ruinous to the business of others and suicidal for himself, yet dealers continue to do this very thing. Some of these reasons may be enumerated, not that we are trying to excuse or shield the dealer for this unprofitable business, but because they throw some light upon the present situation.

A new man in the territory desires to make good; all dealers have had and probably will have the idea that if they can only get a certain number of their machines into service they will be established in the territory. With this in view, rather than permit the sale to go to a competitor, they will at last consent to trade in a vehicle at a figure beyond that at which there will be any profit in the transaction. Sometimes they know this, sometimes they do not realize it. When they do know it, they reason to themselves, "well, I won't do it again, but I must get some trucks in use." Time goes on, and they don't make the sales they have expected to make; another opportunity presents itself, and the same thing happens again.

The unfair business of one or two competitors may also have its weight in a dealer's trading trucks in at too large an allowance. Occasionally, there is a man who is not permanently in the business, who does not intend to pay his debts, and who makes concessions which force the other man, if a sale is to be made at all, to take the second-hand truck at an unprofitable price. Of course these dealers soon go out of business, but not as a rule until several of the other agents who should have known better, have allowed themselves to be drawn into an unprofitable transaction in order to meet the prices offered customers by the unscrupulous dealer.

There is of course no uniformity whatever in the price which is allowed by various dealers on a second-hand truck, and there can be no uniformity in it unless there be concerted action, and co-operation between the dealers. Just as long as individual dealers will make unreasonable offers in trade for second-hand trucks, just so long will purchasers use this to their own advantage and work the offers of one dealer against the other to obtain the very best price for their second-hand vehicle. There should be some uniformity in this matter as a protection not only to the agent but to the purchaser also.

The man who wishes to trade in a truck is very likely to accept the best offer made him for his old vehicle in trade for a new one, and as a rule, although there are exceptions of course, this best offer comes from the concern that is hardest pressed and least likely to stay in the field. The purchaser, therefore, often finds himself with a new vehicle of a make which has been discontinued, or which has no representation in the territory. Therefore a uniform price would protect the purchaser against unscrupulous dealers, who are perhaps "cleaning up."

But how can uniformity in prices be brought to pass? The answer of course is simple; it must be through co-operative action on the part of the dealers. There must be a strong dealers' association, otherwise co-operation is practically impossible. A board of appraisement should be formed, to which all matters pertaining to price which will be allowed by the dealers of the association in any particular city, should be referred. Such a board composed of representative men who know the truck business, would fix a fair and just price on any second-hand vehicle, and any dealer accepting the truck at that price would be sure that the cars could be turned over without loss.

This matter might then be carried further. Second-hand trucks might not only be appraised by the dealers' board, but a sales place of second-hand vehicles could be maintained co-operatively, in which these cars could be put up for sale at the owner's price for a definite period, and if not sold, the price set upon them by the board might be placed upon the vehicle, and it again offered for sale. This service could be done free of charge to customers, provided they purchase

new trucks from a dealer in the association, otherwise a fixed percentage for making the sale should be charged. Arrangements could easily be made to overhaul and put such second-hand vehicles into repair before placing them for sale.

Confidence on the part of the purchasers is what is desired, and a co-operative arrangement of this kind backed by the association representing the dealers of the city, would give the desired confidence to the purchasers, would establish a definite standing for second-hand trucks, and a definite place where purchasers would naturally gather when desiring to buy second-hand vehicles. This in itself would create a certain market.

This is a subject which the dealers' associations already in existence should look into, as the second-hand truck problem is, in the natural course of events, going to be more and more of a problem as time goes on.

BROADER-MINDED TRUCK SALESMEN ARE NEEDED



THE truck salesman, that is the true truck salesman, seems to be a very scarce article. Dealers throughout the country have very soon discovered that the selling of the truck requires a man of considerable training, a man of ability to analyze business conditions. Merely a knowledge of the truck which he is selling is not sufficient, he must be able to analyze the purchaser's business, and prove to him that he can use a truck or a fleet of trucks to advantage. A man who can sell goods on the road or over the counter, when required to go into a man's business, and figure out his cost of doing business and point out the changes in his methods in order to make trucks pay, finds himself in deep water and unable to cope with the situation. In other words, a truck salesman to-day must be as much of an efficiency expert as a salesman.

He must be able to reduce conditions to figures, to gather together all of the facts, and put them in such abbreviated form that the prospect can see at a glance his present costs and where he is losing money, or can see at a glance his present inefficient methods, and where the application of trucks, even where there is no direct gain financially, will increase the business, give better service, and eventually and indirectly increase the profits.

Some of the well-established firms employ such salesmen, but they are expensive men, beyond the reach of many of the smaller establishments. The training of the salesmen should be in this direction. There should be more study of the prospect's business, and more suggestions on the part of the salesmen as to how trucks can be made useful in lines of trade where superficial study might give the impression that trucks would not be of special advantage.

Steel and Rubber Markets

Steel Prices Decline

Although a number of orders have been placed with the steel mills for various forms of steel, the prices of steel and steel products are still on the downward path. Quotations on July 10th were:

STEEL PRODUCTS PRICES

Bessemer steel, per ton, mill	19 00 a 19 50
Open hearth, per ton, mill	19 00 a 19 50
Sheet bars, per ton	20 00 a 20 50
Steel bars, soft base, half ex. tidewater	1 26 a 1 31

The above prices are at tidewater in carloads and larger lots. For quantities less than 2000 lbs., but not under 1000 lbs., \$2 per ton additional is charged, and less than 1000 lbs., \$8 per ton additional.

SHEETS

The following prices are for 100-bundle lots and over f. o. b. mill; smaller lots 2 per cent higher.

Gauge—	Black.	Galvan-ized.	Gauge—	Black.	Galvan-ized.
Nos. 22 & 24	1 65	2 30	No. 28	1 80	2 75
Nos. 25 & 26	1 70	2 45	No. 29	1 85	2 90
No. 27	1 75	2 60	No. 30	1 95	3 05

IRON AND STEEL AT PITTSBURGH

Bessemer iron	14 90 a
Bessemer steel, f. o. b. Pittsburgh	19 50 a 20 00
Muck bars	27 00 a
Skelp, grooved steel	1 20 a 1 25
Skelp, grooved iron	1 60 a 1 65
Ferro-manganese (80 per cent.), seaboard	37 00 a
Steel, melting scrap	11 50 a 12 00
Black sheets, 28-gauge	1 10 a 1 15
Galvanized sheets, 28-gauge	1 80 a 1 85
Blue annealed, 10-gauge	2 75 a 2 80
Tank plates, 3/4 in. and heavier	1 35 a 1 40

Rubber Prices Still Going Down

Most of the grades of rubber are lower in price than when reported last month. Brazilian rubber seems to be firmer. Many of the buyers have allowed their stock to get low, and, on the strength of replacement orders, prices took a very slight upward trend on July 9th. Quotations on July 10th were:

Up-River—		Balata, sh't	64 a 65
Fine	70 a 71	Ciudad, b'k	48 a ..
Coarse	41 a ..	Trinidad, b'k	Nominal
Island—		Africans—	
Fine	58 a ..	Massal, red	48 a ..
Coarse	28 a 29	Red C'go	Nominal
Cameta	31 a ..	B'k C'go	48 a ..
Caucho—		Soudan—	
Balls	39 a 40	Niggers	Nominal
Centrals—		Gambia, prime	44 a ..
Corinto	41 a ..	East India—	
Esmeralda	41 a 42	Smk. sh'ts	57 a 58
Guatemala, slab	38 a ..	Ceylon, his & sheets	40 a ..
Mexican—		Pale crepe	57 a ..
Scrap	43 a ..	Pontianac—	
Strips and scrap	40 a 41	Prime plantation	6 a ..
Guayule	Nominal	Palembang	6 a 7

DOMESTIC SCRAP RUBBER

Boots and shoes	6 3/4 a 7
Tires—	
Automobile	4 3/4 a 5
Bicycle, pneumatic	2 3/4 a 3
Wagon and carriage, solid	4 1/2 a 4 3/4
Inner tubes	10 a 17





INFORMATION BUREAU AND CORRESPONDENCE



SUGGESTS BETTER MEN AND MORE CARE IN SERVICE DEPARTMENT

TO THE EDITOR:

Service, above all things, is what makes the truck go and it means that, unless it is properly attended to, that in a comparatively short time an owner is wondering what is the matter with his truck.

It has been my experience that the head of a certain service department is better fitted for almost any position except the one he was holding and was by no means a practical man at his business.

The general opinion of the average service department seems to be to get the truck out of the shop regardless of how the work is done or how long it will last.

I think that if the employees had a better knowledge of the general assembly of the particular trucks on which they are working a great many mistakes which they now make, could be without any question, rectified to the entire satisfaction of the owner and themselves.

Personal supervision over all work turned out will also help.

I do not care to give any example which show errors in service methods as I have had so many of them that it is almost impossible to determine which is the worst one.

The owner should unquestionably expect that when his truck is sent to any service station that it should be returned to him assembled and repaired in the same manner as was done at the factory.

It seems to me that service must necessarily decrease as the use and knowledge of commercial cars grow older because of the several facts stated above.

There is one truck which I have and which was recently overhauled and I have yet to find any bolt or part which has standard thread or make.

CONTRACTOR.

Peekskill, N. Y.

WESTERN FIRM HIRES TRUCKS

TO THE EDITOR:

We are employing two three-ton motor trucks and pay for same at the rate of \$15 a day. This covers the pay of the driver. All responsibility is lifted from our shoulders by the company from whom we lease the trucks. One of our old drivers, who for years handled our best horse truck, is now running one of the Lewis Motor Trucks and has developed into a first-class chauffeur. We find this method of retaining our old men the best, for the reason that they know where our customers wish the goods delivered.

To the best of my knowledge neither of the trucks has been out of commission for a long time, and I think the year's record will show that they have not missed one working day in the year.

We further believe that leasing of trucks is of greater advantage than possession of same. We have been offered other trucks at cheaper figures, but have decided to keep the Lewis Motor on account of its excel-

lent work. We also hire one small one-ton Grabowsky Truck for which we pay \$10 a day, including pay of driver. All of these trucks run on an average of 31 to 40 miles per day and deliver goods to outlying districts of San Francisco as well as throughout the business and resident sections.

We figure that one truck does the work of two teams of two horses each. We are still obliged to use three two-horse trucks to carry heavy metals between our warehouse and the depot, two blocks away, and believe there is economy in this as the constant stoppage of motor trucks is expensive. The motor trucks are a great saving where long distance routes are to be made.

HOLBROOK, MERRILL & STETSON,
H. M. Holbrook,
Treasurer.

San Francisco, Cal.

THAT "SERVICITIS" GERM

TO THE EDITOR:

Of all the words in the motor car language that have been abused, maligned, distorted and twisted, "service" stands out predominant.

Service is the gutta-percha word that has rung the death-knell of thousands of dealers. It has wiped away their profits, and put many a receiver into a job.

Service has made gray hairs grow where dark hairs grew before. It has driven many a dealer to drink and to the padded cells of the madhouse.

It has driven dealer after dealer out of the motor-car business entirely, or into the accessory line, or made him a garage proprietor. It has put him onto the road, selling goods for someone else, rather than hustling for himself—anything to get away from the word "service," as now interpreted by motor car owners.

Five years ago service meant a "square deal" to the maker, the dealer and the consumer—and all were satisfied.

To-day the general public's interpretation of service is, "getting all I can for nothing—plus."

Motor car owners have, year by year, become more persistent in their demands upon the dealer as to "taking care" of the car after it is sold. There is no class of people in the world that expects so much for nothing as motor car owners.

The owner of an automobile—a manufacturer, for illustration—who, through his own business is a buyer of machinery, and knows that anything mechanical will wear, invests at the same time \$2500 in a motor car, and a like amount in machine equipment for his factory. Six months from date of purchase, some trivial part of the motor car and shop machine becomes worn or broken.

Who repairs his lathe or screw machine? His own mechanics, and neither the boss nor the mechanics growl.

Who repairs his motor car? The dealer, of course, and he repairs it nine times out of ten for nothing—just for service.

Who pays for the bolt, or nut, or screw? The dealer.

Who pays the mechanic for his time? The dealer.

Who is the goat? The dealer.

When a man purchases a motor car, he labors under the impression that the sale is all velvet for the dealer, and because he has favored that dealer with an order, that the dealer is forever and everlastingly under obligations to him.

The buyer does not seem to take into consideration that the dealer has rent to pay, has a payroll to meet, and has the hundred and one office incidentals just like the man who has purchased the car.

This condition does not exist in any other business. It is a condition that has been brought about not only by the motor car purchaser himself but by the dealer. A large proportion of dealers are salesmen, and not business men. Many dealers are so anxious to make a sale, or so anxious to keep that sale away from a competitor, that they throw all business acumen to the winds, and in a big percentage of sales, the dealer is fortunate if he can break even.

He allows his enthusiasm to run away with his good judgment, and is so anxious to make the sale that he makes all kinds of promises to the purchaser as to service, and "taking care of the car after it is sold."

A dealer knows at the time he is making the sale that he cannot possibly fulfil those promises and make any money, or else his enthusiasm has blinded his business judgment.

The matter of service, I believe, is a condition that must be adjusted. The motor car buyer must, from necessity, be educated to the fact that the dealer cannot, day in and day out, week after week, take care of the purchaser's car, when the breakage or wear is not due to poor workmanship or material.

If the dealers of this country expect to be successful, and expect to remain in business, and are not in the motor car business for their health, they have got to sit down and look themselves in the face and determine what's wrong with the way they are conducting their business.

Undoubtedly 75 per cent. of these dealers will learn that their shrinkage is due to "too much service," giving a tire here, a lamp there, and giving away other accessories without any remuneration.

If a dealer is not making a legitimate profit, and if, after a thorough investigation he determines that it is a case of "servicitis," it is up to him to rid himself of that disease.

A dealer can blame no one but himself if he is going beyond the warranty of the manufacturer. All leading manufacturers have adopted the 90-day warranty, as promulgated by the Automobile Chamber of Commerce. This warranty is standard, is equitable, is as fair and square as any motor car manufacturer in the industry can place on his product.

MOLINE AUTOMOBILE COMPANY.
L. M. Bradley,
Director of Advertising.

TO LOWER MOTOR TRUCK FERRY RATES IN NEW YORK

At a hearing before Dock Commissioner R. A. C. Smith, of New York City, on July 6th, representatives of the Merchant's Association of New York City, the National Automobile Chamber of Commerce, the Motor Truck Club of America and other civic and commercial organizations, as well as of the ferry companies, took up the much-mooted question of the discriminatory and unreasonably high rates charged motor trucks by the ferries in and around New York City. The hearing was adjourned for ten days or two weeks to give the ferry companies an opportunity to look into the matter.

W. H. Chandler, assistant manager of the Merchants' Association of New York City, opened the hearing and presented a table showing the comparative rates of the principal ferries and how they were unjust to the motor truck. He said that the same character of vehicles travel on practically all the ferries, and there is no reason why a truck is charged by its length on one ferry and its tonnage on another, but a uniform rate should obtain.

After presenting his tables, he amplified as follows:

The rates charged on automobile trucks appear to be entirely out of line when compared with the rates on horse-drawn vehicles of the same weight and capacity. Generally speaking, the horse-drawn vehicle will take up more room on the ferry boat than the automobile truck. The automobile truck quickly unloads itself on the one hand, while, on the other, it is customary for the ferry company to provide winches to assist horse-drawn vehicles at low tide.

While it is true that the automobile truck may carry heavier loads than the horse-drawn trucks, it is also true that horse-drawn trucks, particularly where the haul to and from the ferry is short, are frequently loaded as heavily, if not more heavily, than the automobile truck is loaded on the average. Beer wagons, which are ordinarily drawn by very heavy horses, will take up more space than a three-ton automobile truck and yet the automobile truck is charged a higher rate.

On the Central Railroad of New Jersey a timber vehicle 40 ft. long, exclusive of the horse, which must be not less than 10 ft. more, making 50 ft. in all, is charged 5 cents less than a 15-ft. automobile truck light. A one-horse timber truck 40 ft. long, loaded, is charged the same as a 15-ft. automobile truck loaded. A two-horse 30-ft. timber vehicle, loaded, will be taken for the same rate as a 15-ft. automobile truck. A 29-ft. automobile truck, light, is charged more than a 60-ft. one-horse timber truck which would occupy not less than 70 ft. on the boat. A two-horse 50-ft. timber truck loaded is charged no more than a 29-ft. automobile truck, loaded. The same discriminations appear in substantially all of the tariffs.

J. K. Marvin, president of the National Automobile Chamber of Commerce, and George B. Duck, president of the Motor Truck Club of America, endorsed Mr. Chandler's presentation of the case, and Mr. Duck also submitted a memorandum to the Dock Commissioner, the memorandum embracing nine reasons in support of his contention, as follows:

1. Motor wagons and trucks occupy less space than horse-drawn vehicles, permitting a greater number on the boats and therefore a larger amount of revenue.
2. Motor truck tires are wider than those of horse vehicles, thus distributing the weight more evenly on deck timbers.
3. Motor vehicle tires are universally of rubber, thus causing less wear and tear upon deck timbers.
4. When on the boat, motor trucks are absolutely stationary, whereas horses are constantly in more or less motion, stamping upon the deck timbers with their cork-shod hoofs, causing unnecessary wear.
5. Motor trucks, while on the ferries, have their brakes locked and there is no liability of accident due to sudden stopping or starting of the boat as is the case with horses.
6. Motor trucks move more rapidly in stopping and starting and the loading and unloading of the ferry boats is therefore subject to less delay from this standpoint.
7. Motor trucks are never inconvenienced by any incline of the approach to or from the ferry boat, due to the falling of the tide and therefore eliminating the necessity of a power windlass which has been necessary to aid the horse vehicles.
8. The deterioration of floor timbers from chemical action resulting from the presence of horses is absolutely eliminated with motor-driven vehicles.
9. The presence of motor trucks upon the ferries eliminates the necessity of any one man or number of men whose duty it is to clean up the refuse which the presence of horses requires.

Mr. Chandler also presented the following table, showing the more equal ferry charges between Boston and East Boston:

Automobiles

Small motor truck (same as one-horse team)...	4c.
Large motor truck (same as two-horse team)...	8c.
Very large motor trucks (same as three-horse team)	10c.
Runabout automobile (same as one-horse pleasure vehicle)	4c.
Touring car (same as two-horse pleasure vehicle)	6c.

GLANDERS CAUSING MOVING-VAN OWNERS TO PURCHASE TRUCKS

Horse users have recently been making application for trucks, especially in New York City and Philadelphia, where what almost amounts to an epidemic of glanders has been in progress. In New York City over two thousand horses have died or been condemned this year. One firm alone in New York City lost thirteen horses in rapid succession valued at approximately \$300 each, or a loss of \$3900. It also cost them some \$1800 for other expenses. Another company in the same district lost seven, and also some horses which they were boarding. Another company lost eight. These concerns were connected with the warehouse and moving business, so the matter was brought before the Warehouse Association in the hope of putting through an ordinance to do away with the open troughs, a common source of the spread of the disease.

In Philadelphia, such an ordinance was passed, and all the drinking troughs have been displaced by hydrants, the owners carrying their own individual buckets.

The New York Board of Health and the Board of Agriculture finally decided to have all horses arriving in New York from New Jersey held up and quarantined for ten days unless treated with mallein for the prevention of glanders, so that they might be able to trace the outbreak which is now so prevalent in the metropolis.

Those interested in Jersey held a meeting at which New York officials were present and the time limit on the embargo was extended to September 1.

On account of horse troubles several of the van men have been purchasing electric vehicles, and others are investigating the use of trucks.



Bessemer One-Ton Truck Used by the Automobile Trail-Blazing Association

The Automobile Trail-Blazing Association is using the Bessemer Truck on one of the biggest trips ever contemplated. This truck was driven from Grove City to Philadelphia and to New York. It traveled through the northern part of New York State and is now in the Middle West, with Seattle, Washington, as its destination. The purpose of this tour is to blaze a trail from New York City to Seattle, making it possible for any motorist to follow the signs and signals painted on the telegraph poles, enabling him to make the entire trip, from coast to coast, without any reference to a guidebook.

The Truth About Trucks in the Service of Uncle Sam, for War Purposes

A Criticism—Suggestion for the Establishment of a Corps in Charge of All Army Cars

By E. S. FOLJAMBE



THE present situation on our Southern border has again brought the army and its methods into the limelight, and from one source and another we hear of the phenomenal work being done by motor-driven vehicles in army service. We often read newspaper items in which the impression is given that the army mule is fast being displaced. It is therefore, fitting that at this time a true statement of the situation be made.

To begin with, the government of this country has not as yet given any consistent thought or consideration to motor-driven vehicles. For a branch of the service so well organized and so methodical as the army, the haphazard and slipshod methods which have been used in the few dealings with commercial cars that they have already had, are most surprising. Do not misconstrue my meaning, there are trucks and special motor-driven apparatus in use, but in such small numbers and handled in such an ineffective way, very often by incompetent men, that they do not constitute, taken as a whole, a sufficient number to be of any great importance. True, the government recognizes the value of such vehicles where large quantities of ammunition, supplies, and troops are to be transported with great rapidity. This has been shown by the

fact that large numbers of trucks are repeatedly employed, that is, hired, whenever important maneuvers are scheduled, but when it comes to a definite and well-organized scheme of motorizing the transportation facilities of the army of the United States, nothing as yet has been done.

Many of the trucks now in government service are not owned by the United States, but their services are contracted for the same as is done in the post-office department. However, at the present time the government is using more trucks in connection with the movement of troops and supplies at the Mexican border than have ever been used before. The following is the list of the 109 cars now owned by the United States Army:

	United States	Philippine Islands
Motor cars	27	9
Motor trucks	57	12
Motor ambulances	3	1

Uses to Which Motor-Driven Vehicles Can be Put by the Army

Before giving a further detailed statement of the haphazard and hit-or-miss methods so far employed by the government in the purchase of the few vehicles already owned, it may be well to point out where motor-driven vehicles can be used, and the advantages of their use. There seem to be many army officials who desire

to originate or cause manufacturers to design a type of vehicle which might be said to be of a universal nature, that is one that cannot only transport goods in itself over ordinary roads, but can be used as a tractor and can upon occasion negotiate deep mud holes, or cross plowed fields. The government asks that all parts be standardized and interchangeable and is looking for some kind of a conglomerate vehicle which can be used anywhere, and for any purpose. Specifications have been drawn, and attempts have been made to design and build such a multi-use construction, but of course have failed.

Present Types Suitable for Seventy Per Cent of the Work

It must be realized that for 60 or 70 per cent. of all of the requirements of the army, standard commercial cars now on the market are eminently more fitted than any freak machine which might be developed for the remaining small part of the work. In other words the army can use to the greatest advantage, any of the well-known standard makes of machines at the present time for the tremendous hauling and transportation of materials and supplies which is constantly going on for the maintenance of the large number of army and artillery posts scattered throughout the United



Unloading One Thousand Bags of Mail at Vera Cruz, for the Interior

UNDERWOOD & UNDERWOOD, N. Y.

States. Nearly all of these are located in the vicinity of large cities. This must necessarily be so as they are placed there for the protection of these communities. They are all served by good roads. Every condition is right for the use of motor-driven vehicles without any change whatever, except that a large number of their expensive horses and mules could be dropped at once, if motor-driven apparatus were installed. For instance, take a well-known artillery post in the vicinity of New York City. Thirty horses or mules and wagons are required for transporting the necessary supplies for this post. Five commercial cars

work the open market offers vehicles eminently suitable. If the army posts throughout the United States were thus supplied with motor-driven vehicles, the necessary experience with trucks could be had leisurely, and gradually until the types of vehicles best adapted could be determined, and an efficient group of operators developed. This latter statement may sound more or less unimportant to those who have not studied the situation, but instead of being unimportant, the matter of competent drivers for the vehicles in army service is one of the greatest handicaps the government is now working under.

ity would be many times what it is in the ranks. He knows there is nobody who knows even as much as he does about it, and goes ahead boldly with his men. The result of course could not be otherwise, the trucks are run without sufficient lubrication they are shamefully abused, and put out of commission in the shortest possible time. Then the officer in charge reports that motor-driven vehicles are not much good in his department or for his service.

To prove this statement it is only necessary for anyone interested to inquire of a regular government operator of a motor-driven vehicle, to find out that he knows practically nothing about the mechanism or even the parts that should be oiled, nor the intervals of time at which they should be oiled. Is it any wonder that more vehicles are not employed?

United States Truck Methods Contrasted With Electric

In no other department are the same haphazard methods in use. The reason is simple enough; the truck is a new proposition, and army methods have not been systematized with reference to it. For forty years the United States Army chose its cooks by lining up the men and picking out a few alphabetically, absolutely without regard to their ability or previous knowledge of the culinary art. At the present time the army maintains a cooking school in which men are trained to cook, so that the entire army is not affected with indigestion. Expert cooks are now assigned from this school where needed.

Again in connection with electrical apparatus, much of which is used in the various posts and in connection with modern long-range high-powered ordnance. Men of good mechanical training, many of them West Pointers are assigned as instructors in special schools, where all the details of electricity and electrical apparatus are taught. These men are then placed in the large factories where electrical apparatus is built until they are thoroughly conversant with both construction and operation. The electrical stations in the army posts are models of efficiency and are controlled by men who know what they are doing. Suppose for a moment that a greenhorn were placed in charge of one of these electrical stations. What would be the result? Yet this is exactly what is being



White Army Truck at Vera Cruz

A detachment of General Funston's brigade loading supplies for Vera Cruz outposts

could displace this entire equipment, with resulting efficiency in the service, and at less actual cost for the work done. Take another instance, one of our well-known proving grounds, where ordnance is tested, is in a location which requires a considerable haul. Army wagons with horses and mules are constantly plying up and down the roads to this station, never making more than an average of 3 m.p.h., and dragging out the work which could be done in one-quarter the time by motor-driven vehicles and at less expense.

The Logical Place to Begin

The army and artillery posts throughout the country are the most logical places to begin motorizing the equipment. For this

Lack of Competent Operators

How does the government obtain its drivers for motor-driven apparatus? One would naturally suppose that experts are employed, but here are the facts of the case. Inquiry is made among the men, and it is found that John Smith at one time before entering the service was a chauffeur. John Smith is therefore put in charge of the vehicles. There is nobody over John Smith that knows anything at all about trucks, to judge whether he is competent or not. Certain men are alphabetically detailed to him, and he is entrusted with teaching them how the work should be done. John Smith is probably an incompetent, for as a chauffeur his earning capac-



With the Red Army of Invasion—The Connecticut War Maneuvers

Detail of Company I, Tenth Regiment, unloading supplies from the new auto trucks



UNDERWOOD & UNDERWOOD, N. Y.

After the Battle of Vera Cruz

The first army auto truck in Vera Cruz; used to transfer supplies to outposts

done to-day in connection with the use of motor-driven vehicles in the army. There is no school, there is not even a corps in charge of motor-driven apparatus, and men for the work are picked at random, irrespective of their knowledge and without testing what they know.

Motor Corps Suggested

Until there is established in the army a regular corps in charge of all motor-driven apparatus, there can be no great advance in the use of such apparatus in the service. The greatest need at the present time is not for appropriations with which to buy vehicles, but first for the establishment of a corps of experts to test and control the vehicles after they have been purchased, and to train the men to handle the equipment properly. The members of this corps should be selected for their knowledge of the subject, and should remain in charge of the work long enough to accomplish the purpose for which the corps is established.

If \$100,000 were appropriated to-morrow to buy trucks, this money would simply be spent in hit-or-miss fashion, and all that would be necessary would be to produce receipts showing that the money had been expended for this purpose. Results with the equipment are not required, there is nobody, nor any group of men at the present time in the service whose duty it would be to follow up this newly purchased equipment and see that it was properly used, or that any results whatever were obtained from the expenditure of the money.

Changing, Ever Changing

Another of the great handicaps to the introduction of motor-driven apparatus into army service is the fact that the men assigned to the various positions do not remain long enough in any one place to accomplish much. All the buying that has been done has been by individual departments here and there throughout the country, without reference to what any other similar station at another point was doing, with no co-operation one with the other or even knowledge of what the other was doing, literally in a hit-or-miss fashion.

A colonel, a captain, or some other officer perhaps has knowledge of trucks, realizes the requirements in his particular vicinity, and after spending a great deal of time talking and writing, is at last permitted to put through the requisition for what he requires. No sooner have the vehicles been installed than he is transferred to some other station, and they fall into

no wonder that truck makers will not spend money in developing vehicles asked for, when they have no assurance that by the time the vehicles are completed that they will even be dealing with the same men who started the transaction. All of this trouble can be done away with by the establishment of the "Motor Corps" above suggested.



Federal Truck Carrying Machine Guns

If in a sheltered position, the guns can easily be operated right on the truck, as it gives sufficient room and a perfectly solid, steady footing

the hands of his successor who knows nothing about a motor-driven piece of apparatus, or who let us say, does know something about them, but has ideas entirely at variance with those of his predecessor. He sidetracks the vehicles or makes them show a very unsatisfactory record, and then puts through an order for the type of machine that he believes is better. Result—money wasted, trucks given a bad name, truck makers disgusted. It is

Admit That Trucks Are of Great Use

It is admitted by army officers conversant with the situation, that trucks would be of the greatest advantage in mobilizing troops and transferring their baggage, tents and entire outfit to the point where the mobilization is to take place. There is a grave question as to the utility of any motor-driven vehicle beyond this point; in other words, after the army enters the enemy's



UNDERWOOD & UNDERWOOD, N. Y.

High-Powered Autos Used by Rebels in Capturing City of Victoria From Federalists

The above photograph shows six high-powered automobiles loaded with thirty-three thousand rounds of ammunition, which were rushed with all dispatch to the Rebel ranks when they captured the city of Victoria from the Federalists.

country, but this is a question which is in dispute, and many believe that properly developed apparatus would be of great service even beyond the point of mobilization and in actual warfare on the field.

It is one of the principles of military strategy to follow with large bodies of men the main arteries of travel. Does anyone condemn the railroad train because it cannot leave the tracks and go across a plowed field? Yet railroads are used extensively by all nations in the movement of troops and supplies. Does anyone condemn the poor army mule because he travels at a snail's pace when great speed is really essential? Yet mules are used. Motor-driven apparatus would be of the greatest service, especially if owned by the government and having been in use for a period, capable men were available as operators. In Europe the government subsidizes the vehicles in use by merchants with the one idea of being able in time of need to make use of them.

Motorcycles Useful

Even the smallest of motor-driven vehicles are being used to great advantage by foreign powers, but not so in the United States. The United States has no motorcycle corps, as has England, France, Germany, and the other powers. These vehicles are eminently suited for many purposes, take for instance in the Signal Corps. A telephone system has to be laid out at express speed. It is of the ground type. It covers a front of 60 miles. With present methods it requires about six days to establish it. It requires a day and a half by horse to get from station to station, while with a motorcycle it can be done in 6 hours.

A few motorcycles are now in use for such purposes at the Mexican Border. At the present time there are six Indian motorcycles in exactly such service, but it is a



UNDERWOOD & UNDERWOOD, N. Y.

The New Automobile Artillery for Shooting Aerial Enemies on the Wing

The scouting and aggressive possibilities of the aeroplane and dirigible have resulted in the invention of artillery for their special benefit; mobility and rapidity of fire being the chief characteristics of these guns. This view shows several of the latest guns of this sort, parked at the Army Aviation School, College Park, Md. As will be seen, they are fitted on armored automobiles, some of which latter have wireless apparatus also. The new artillery is manned by the United States Signal Corps.

special and isolated case. Tests were made by an individual officer, and it was found that averaging 60 miles a day, the total cost for this service was 12 cents per vehicle. Not only in maintaining but in laying and establishing such a system motor-driven vehicles could be used to advantage.

For the Aeronautical Corps

The aeronautical service comes under the general heading of Signal Corps. For this work nothing is so well suited as motor trucks. In Europe, especially in France, vehicles for this work have been developed to a high degree, and in this article will be found illustrations of those now in use. Some attempt has of course been made to use them here. Eight aeroplanes constitute an outfit. Vehicles with special bodies for carrying these aeroplanes in a somewhat

knocked-down condition are used, a car is employed for carrying the operators, another is fitted out with spare parts and materials, still another forms a complete machine shop and repair department, so that on the field the aeroplanes can be repaired. A tank car is also used for carrying the fuel. The entire squadron for the eight aeroplanes consists of sixteen trucks. As one major in the service put it, "the most dangerous thing that can be done with an aeroplane is to fly it," therefore it is essential that it be moved with as great rapidity as possible as close as possible to the point where it is to be actually used, without damage to the aeroplane. There is but one answer for this transportation, namely motor-driven vehicles.

For Moving Searchlights, Supplying Power, Etc.

In Europe the powerful searchlights now considered as absolutely essential to modern warfare are motor mounted and operated. Illustrated in this article will be found such vehicles as used abroad, yet in the United States, searchlights with one or two exceptions throughout the entire army are on large wheels and must be pulled by horses or mules at a snail's pace. These have generators driven by gasoline engines, but still are incapable of self propulsion.

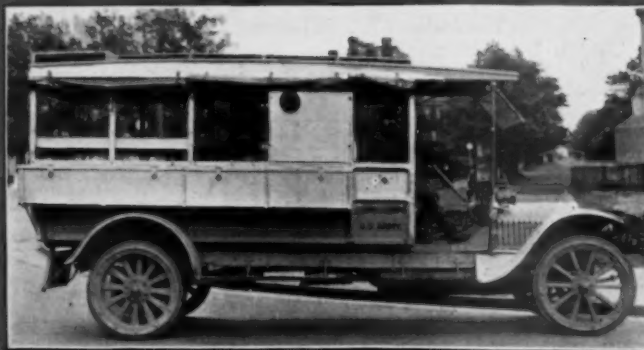
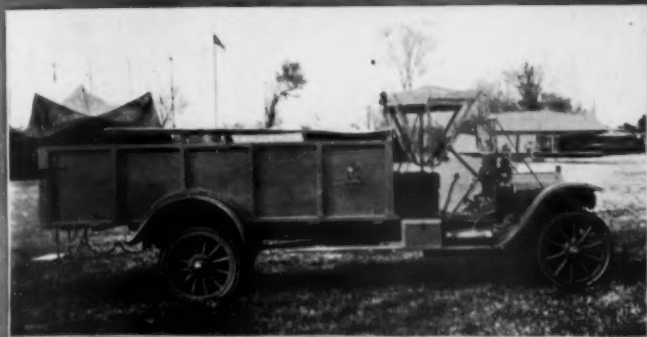
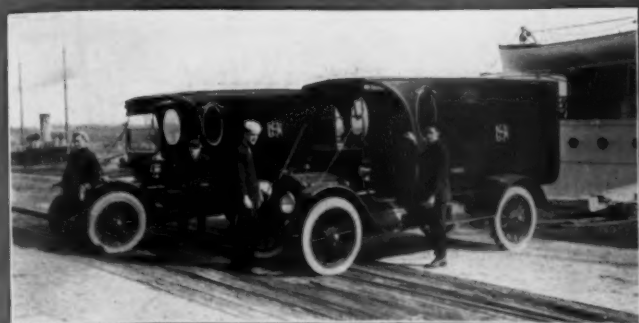
In and around every army when in the field there must be power producers. This means bulky heavy machinery which must be transported. Motor-driven apparatus is the only solution of quickly handling these machines. It will be seen, therefore, that there are many and varied uses for motor-driven apparatus. The possibilities of moving ordnance and heavy guns have not even been touched upon.

Future Possibilities

The reason for this is because the writer believes that this use for motor-driven apparatus is in the very distant future. There are so many present and urgent needs for motor vehicles already developed that this subject need be but very briefly touched upon. However, the time will undoubtedly come when special powerful motor-driven apparatus of the short wheelbase, tractor type will be developed, capable of hauling an eight-ton cannon across a plowed field



Two-Ton Sampson Truck on Mexican Border, in Service of Quartermaster's Department, Carrying Supplies



White Trucks Used by Army to Carry Wireless Apparatus

The four illustrations in the upper half of this page group show White trucks doing duty around the Washington Navy Yard, in service of the Quartermaster. The lower four illustrations show different views of the latest wireless outfit used by the Army. It has a range of eight hundred miles, and is operated by the motor of the truck. It takes the men only twelve minutes to set up the wireless apparatus.

if necessary. There are tractors in existence to-day that can do this very thing, provided only that the piece of ordnance be fitted with tires as suitable for this kind of work as the tractor, but these things will take care of themselves in the future. Without question, attachable metallic rims with mud-shedding webs are perfectly possible, and could be quickly applied when a piece of ordnance of heavy weight has to leave the travelled road and start across country. With powerful engines, winches, cable, etc., a cannon could be moved to almost any position, and pulled out of

driven directly into a swamp under any circumstances, to a point where it would sink, but this gives a fair idea of the kind of tests that are likely to happen as a limiting case.

United States Tractor Test Soon

That the government is interested in such tractors even at the present time is shown by the fact that through the influence of one captain in the service, a public test of a foreign tractor of Panhard make is scheduled to take place at Rock Island, Ill., just as soon as the vehicle can be brought

trials and sham battles near Willets Point, N. Y., it took over a day to get the men and materials on the ground where the battle was to take place, while a few hours would have been sufficient with trucks. In other army maneuvers it is very noticeable that the colonels and those on their staff used automobiles of their own instead of horses in their trips from one section to another. It was also very noticeable that those in automobiles were able to go from section to section, obtain the information desired and return in less than a single morning, while those officers on horseback



The Autocar Which Covered 1509 Miles Through the South, in a Recent Government Test

Top left: Where stream and road blend. One way of keeping down the dust on the National Highway. Top right: One of the places required "sounding" before progress could be made. Lower left: Coming to the surface, after a particularly deep dive. Lower right: Autocar backed, to show how mud was scraped by its axles

holes from which an army of mules would not suffice to move it. A tractor of the present day that will pull fifty plows through the earth at one time at a fair rate of speed, itself travelling over the surface of the field, is sufficient guarantee of the future possibilities of such motor-driven ordnance tractors as here outlined.

There is a disposition on the part of the army to test any device to the limit, under the worst possible conditions. For example a tractor was being tested by one of the army officers, and he drove it directly into a swamp as far as it would go until it sank. It was finally extricated, however, under its own power, by the use of planks, etc. This of course is not a fair test, because no heavy piece of apparatus would ever be

from abroad. It is said that American truck and tractor manufacturers will be invited to be present, and that the government is going to put this tractor through the most severe tests possible. It is hoped that the American makers will also attempt subsequently to put into the field vehicles for the same kind of service.

Useful in Army Maneuvers

In the army maneuvers which have been carried on in 1909, '10, '11, '12 and '13, the value of motor-driven vehicles has been recognized by the government, as shown by the fact that many of these vehicles were hired for use during the particular events. Illustrations herewith show some of such vehicles in use. At the military

were unable to accomplish the same work in 24 hours. In the construction of bridges by the engineering corps, where motorcycles were hired for these men, it was found that the bridges were actually built and completed while the army was yet 4 miles away, instead of the army having to wait for the constructions to be completed.

The statement was made by one United States Major that, if for any reason 400,000 men should be required to be put into the field, or even 200,000, it would be impossible to obtain mules to care for the transportation requirements. The opinion was expressed that the mules were more reliable, but, at the same time, that the trucks were three times as fast and car-



Around the Camp Fire



Autocar Delivering Eatables at Camp

ried three times as much, and therefore were able to handle nine times the material that a wagon with army mules would transport.

Commercial Cars Used in 1909 War Maneuvers

In the extensive war maneuvers of 1909 in Massachusetts, in which the Red army finally overcame the Blue and captured Boston, trucks were used to a greater extent than at any previous time. Ten Autocars were hired by the government and constituted the first automobile train ever used by an Army Quartermaster Department in the United States. In the accompanying photographs some of these cars are shown on the road and in the field during the maneuvers. They were employed by the army of the Reds, which won. Whether this fact has any significance we cannot say, but it is certain that they were able to move faster than those employing horses and army mules alone. Autocars were also used at Gettysburg in 1910, 1911 and 1912. These machines cared for all haulage for the National Guard.

War Department Truck Test for 1912

Perhaps the nearest approach to any real test was conducted by Captain A. Williams and Captain H. A. Hegeman, of the

Quartermaster Department, in March, 1912, Fort Benjamin Harrison, Ind. This was the most rigorous test that could be imagined, although there were but four entries, one of which was a 1500-lb. Sampson truck, which was especially built according to the ideas of Captain Williams, one and a half ton Autocar, one and a half ton White and a four-wheel drive. The test began on February 8th at Washington, and the route was over the practically impassable roads of Virginia, North Carolina, Tennessee and Kentucky, ending at Indianapolis on March 28th. The distance covered was approximately 1500 miles, 1400 miles of which were through mud and inundated roads, where soundings had to be taken before the cars could proceed. The truck made an unusually good showing, considering the fact that the time of the test was in the rainy season, with the roads at their worst.

The performance of the two-cylinder Autocar was a surprise, going through without replacements. In the accompanying photographs are shown some of the conditions that were met on this trip. Attention was called to the fact, after this run, that, if even the cost of a single battleship were put out on some of the roads of the South, there would be a tremendous

saving in the cost of army maneuvers and the movements of bodies of troops and supplies would be greatly facilitated.

Commercial Cars Assisted at the Fiftieth Anniversary of Battle of Gettysburg

This reunion of the Blue and the Gray, July, 1913, had been contemplated for several years, and very extensive arrangements planned to make the project a success. In undertaking the establishment of a camp for the accommodation of nearly forty thousand old and infirm soldiers, the government realized it had a gigantic task before it, such as never had been attempted in the history of the country. Army experts of wide experience, representing garrisons and depots in all sections of the country, were detailed to plan and carry on the work. Corps of men layed out the water, lighting and drainage systems with the same care as those of a city.

The importance of adequate transportation facilities was considered with the same care and thoroughness. Autocars were selected for the gigantic task of providing transportation facilities of equipment and supplies.

All preparations were completed for the original number of veterans expected, but at the last moment reports came in from



Autocar Loading Army Supplies at Railroad Station



Loading Supplies From Vessels on Autocars

the various state headquarters that many in addition to the estimated number would attend the reunion. It was at this point that the Autocar went into service, having less than two days to distribute the additional equipment to increase the capacity of the camp fully one-third, whereas it had taken months for horse teams to handle the equipment for the original camp. Thousands of veterans arrived ahead of scheduled time, and in addition to distributing the equipment mentioned above, the kitchens established for these veterans were furnished with commissary supplies.

The arrival of the main body of veterans covered a period of two days and nights, and during this time the trucks were practically in continual service, the drivers being relieved at intervals. This strenuous service continuing throughout the entire encampment was strictly field service. There were no roads, and all traveling had to be done over rough fields, through deep ditches and gullies and over steep embankments. Several severe rainstorms aggravated the conditions, but the motor-driven cars handled the men and supplies on schedule.

The officers in charge were unanimous in the opinion that each car gave better and more reliable service than ten or twelve



Federal Truck Doing Transport Duties

of which is the Jeffery, made by the Thomas B. Jeffery Company, Kenosha, Wis.

This truck was designed to meet the requirements of the United States army, the specifications calling for a one and one-half ton truck, with 20 per cent. overload, that would go anywhere on its own power

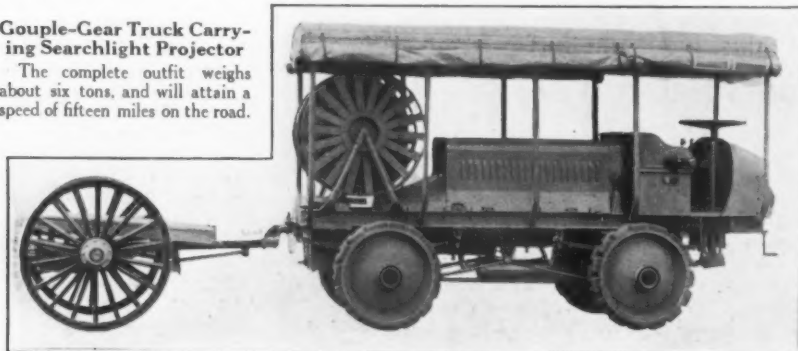
simple dry disc clutch which picks up the load without jerk. The drive from the clutch is by means of a propeller shaft, with universal joints to the transmission, which is located in the center of the frame, suspended on two cross girders, set high to allow the maximum of clearance, 24 in.

The transmission has four speeds forward and a reverse. Coupled with the transmission is a differential. The drive passes from the transmission gears to this differential, and from this differential two propeller shafts, with universal joints, transmit the power to the two differentials, one each located on the front and rear axle. From these differentials the power is transmitted by means of shafts to each of the four wheels, there being a steering knuckle for each wheel.

Four-wheel-driven vehicles are very much in favor abroad for army service where soft ground or very bad muddy roads have to be negotiated.

Gouple-Gear Truck Carrying Searchlight Projector

The complete outfit weighs about six tons, and will attain a speed of fifteen miles on the road.



two-horse teams. In the short space of one week, all tentage, cots, bedding, kitchen supplies, etc., for fifty-three thousand men were collected and loaded directly on freight cars, without the advantage of a loading platform.

Four-Wheel Drives

There are several four-wheel-driven trucks made in this country, most recent

where a four-mule team could pull a load.

In this truck advantage has been taken of all the efforts that have been made in Europe as well as America to produce a motor truck that would be able to propel itself under any and all conditions where it is possible for any vehicle to operate.

From the four-cylinder en bloc motor the power is transmitted through a very

New Wireless Truck of United States Signal Corps

For the next field operations of the army, or for immediate use in Mexico, if necessary, there is now available a wireless truck which can be set up for use in 12 minutes and send messages within a radius of 800 miles under favorable conditions.



White Trucks in the Army Service Hauling Men and Supplies



Locomotive Hauling Camp Supplies
Fitted with steel wheels and solid tires

The truck was built specially for the Signal Corps by the White Company, of Cleveland. It is shown in the accompanying page plate. In tests that have already been made, this set has received messages from points 2500 miles distant. The electrical pressure reaches 90,000 volts at the top of the antennæ. The great range of the new equipment and the speed with which it may be brought into action is due to the employment of a powerful electric generator, driven through a train of gears by a 30-h.p. motor of the White truck.

The generator delivers electric current of 500 cycles at 110 volts and from eighteen to thirty-two amperes. This current is interrupted by the relay, operated by the sending key, and is transformed so that it leaves the side of the wireless truck at a pressure of 22,000 volts and an amperage varying from eight to twelve. As the current rises to the top of the antennæ the voltage rises to approximately ninety thousand, while the amperage approaches zero.

The radiation under these conditions gives a sending ability from 200 miles under the worst conditions in daytime up to 800 miles under good conditions obtained in the early hours of the morning, when there is less electrical disturbances due to electrical plants of various kinds.

The antennæ is of the umbrella type, mounted at the top of an 85-ft. mast, which

is built in nine sections. The first, or top, section is raised by hand, but the other sections are lifted by a block and tackle suspended from struts mounted on a platform



White Truck Being Loaded With Supplies for Soldiers at Mexico
Using Firestone Tires

on the roof of the truck. These struts are quickly detachable when not in use. The guy wires are attached to the fifth section of the mast. When dissembled, the nine sections of the mast are carried in long compartments built along both sides of the

truck. The counterpoise, or artificial ground, consists of heavy insulated wires radiating from a common center, to which is attached the ground wire of the wireless set. For convenience in grounding there is a socket on the outside of the truck body into which a ground-wire plug fits.

The truck has been subjected to many interesting tests, and the wireless officers are pleased with its work. It was sent to the practice camp of the heavy field artillery at Tobyhanna, Pa., last month, where artillery guns, set up on one side of a mountain, fired over the mountain at targets on the opposite side. During this test the wireless truck was used to send messages from Tobyhanna to Washington.

Prior to the artillery practice it was tested in Washington, and messages were received from Boston, Brooklyn, Key West, Porto Rico and ships at sea. At the same time, the operators took up one end of a conversation between the operator of the big station at Arlington and the Honolulu station in the Pacific Ocean.

Michigan Guardsmen Substitute Federal Truck for Mules and Horses

This Federal truck has been used quite extensively in tests conducted at Fort Wayne, Mich.; at maneuvers near Trenton, Mich.; at a national rifle competition



White Trucks Loading Baggage for Shipment to War Maneuvers Camp



Peerless Five-Ton Truck and Trailer Hauling a Big Load

at Camp Perry, Ohio, and in maneuvers near Inkster, Mich. The most severe kind of work was put upon the truck, after its pulling power and sturdiness had been proved out, and it gave very satisfactory service under all sorts of conditions. While in the field it hauled supplies, transported machine guns and their crews in the maneuvers, and carried loads up and down hills impossible to negotiate with an escort wagon. It has proved a very valuable adjunct to the military service.

Its capacity, 3000 lbs., allows for good, bulky loads of ammunition, intrenchment tools and supplies of all kinds. Where the going is smooth and level a heavily loaded trailer is feasible and extra work can be done. In maneuvers the truck has been used with great effect in speedily getting squads of men from one position to another.

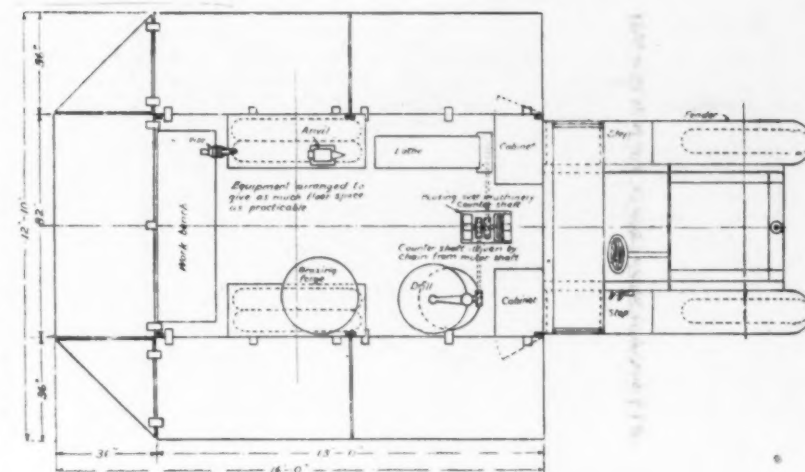
Searchlight Carried on Couple-Gear Truck

An accompanying illustration shows a searchlight projector outfit recently shipped to the government at Philadelphia. This outfit consists of a standard type H couple-gear parts, carrying a 13 k.w. generator, direct connected to a governor-controlled, four-cylinder, four-cycle, $5\frac{3}{4} \times 6$ -in. bore motor. One-half mile of flexible cable is carried on the reel at the rear end of the tractor, while the searchlight itself is carried upon the trailing cart. This outfit, complete, weighs approximately 6 tons, giving up to 15 miles speed on the road. The wheels are equipped with nigger-head hubs, so that the individual wheels may be used for pile driving and other work of this class. The outfit will be used for lighting camps and operating searchlights at the front. It is capable of traveling over all kinds of roads; will furnish 16,000 candlepower light continuously. In recent tests it passed in a very satisfactory manner indeed, the longer test being of 9 hours' duration, 6 hours' steady run at normal output plus 3 hours at 30 per cent. overload.

MOTOR-DRIVEN APPARATUS NOW IN USE IN THE ARMY

The Tire Problem

During June the Secretary of War approved contracts for supplying the army with twenty motor trucks, based on bids of a few weeks previous. These contracts were awarded as follows: White, four trucks; Kelly-Springfield, Federal,



Machine Shop Car for the Aeronautical Squadron
Plan view, showing arrangement of tools

Driggs-Seabury, Lord Baltimore, one vehicle each; Jeffery four-wheel-drive trucks, two; Velie, five; Mack, two; Lippard-Stewart, three. These are for use in connection with the army now on the Southern border. It is said that certain tests will be made to determine if possible the comparative fitness of these vehicles. The Alma Motor Truck Company recently sold five trucks for use on government reservations in California and Arizona. A novel feature of the equipment of these vehicles is in connection with the tires. Tests conducted by the Lincoln Republic Truck Corporation of Los Angeles showed that best results were obtained with dual tires on the rear, the outer one being of the continuous tread type to bear the load, while the inner one was of the block type, giving traction in soft sand.

The subject of tire equipment on these vehicles is something of a problem, pneumatic tires being too liable to structure from road constructions and bullets preclude their use, solid, quick-removable tires have taken their place. General Blanco, of the Rebel army in Mexico, narrowly escaped being killed by having all four of his tires punctured by bullets. One of the captains of the Quartermaster Department stationed at Galveston, in charge of automobiles, immediately equipped the few

pneumatic vehicles with solid Firestone's on quick-removable rims.

Armored Trucks in Use in Mexico

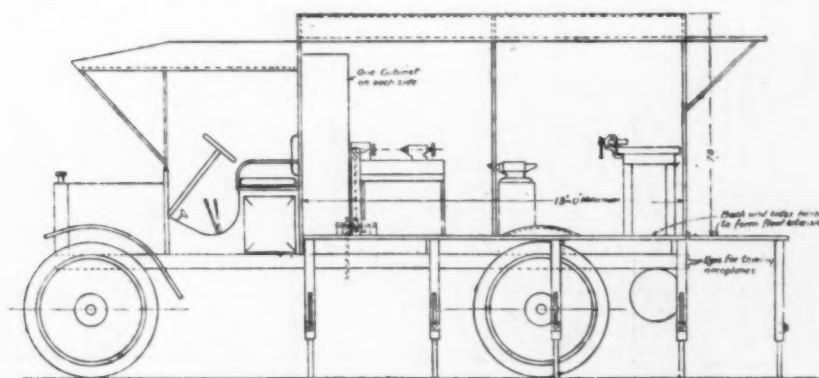
The Alma Company has also been given an order for four Republic trucks for use in the Federal army in Mexico. These machines have a very novel equipment. The bodies look very much like an enlarged dog kennel attached back of the hood. They are covered with heavy armor plate, impenetrable to either Mauser or machine-gun fire. This steel case completely covers the sides and the bottom of the car, protecting them from explosion from beneath. They are equipped with Firestone tires on demountable rims, and extra flanges are carried which can be put on in place of the solid tires, so that the vehicles can be used on railroad tracks. They are capable of a speed of 40 m.p.h. on the railroad. Under the sheet steel floor, between it and the armor, is carried cases of extra ammunition, supply parts and fuel sufficient to run the machine 500 miles. Wireless equipment is also installed, so that the operator can keep in touch with headquarters. The truck will carry three machine guns and one field rifle and a crew of twelve men, and their performance is being closely watched.

Villa Using Army Truck

The Mexican Rebel leader, Villa, is making successful use of an armored Mack truck, provided with both rubber tires and flanges for use on railroad tracks. It is patterned after the ones in service in the Russian, French and German armies. It carries seven machine guns. The armors of the car are made of two walls of steel plate, filled with layers of felt. Extra parts, fuel and ammunition are carried, as well as a powerful searchlight.

At the time of this writing, it is reported that the Quartermaster Department has contracted for the coming year for about one hundred and twenty Vulvan trucks, manufactured by the Driggs-Seabury Company, of Sharon, Pa. If this is true, it is one of the largest, if not the largest, order yet placed by the government for motor-driven vehicles.

(Continued on Page 52)



Side View, Aeronautical Car

Eight aeroplanes form an aerial squadron and are accompanied by a machine shop, as shown



The Stewart Motor Corporation's New Fifteen Hundred Pound Capacity Series No. 2 Commercial Cars

By GEORGE W. GRUPP



THE Stewart Motor Corporation, Buffalo, N. Y., on June 15th placed their Series No. 2 of 1500-lb. capacity commercial cars on the market to replace their Series No. 1.

The new series contains a great many important improvements. It has over five hundred less parts; 25 per cent. more mileage from gasoline and oil can be obtained; more tire mileage; it has a unit power plant with three-point suspension, thus reducing a number of parts, relieving the transmission and clutch from frame strain, power plant is more quickly and easily removed and the transmission and clutch are in better line with the motor; then it has straight side members in the frame, off-sets being eliminated; a more simple and effective cooling system, replacing the centrifugal water pump with a siphon; a Zenith carburetor has been added; a simpler and stronger radiator, contained in cowl at dash; glass front and mechanically operated horn as regular equipment; Westinghouse Electric Starter, electric lights, supplied when desired, \$125 extra; and many minor refinements.

The new Stewart chassis is lighter, stronger, simpler, more economical and fool proof than Series No. 1. Most of the units are more easily accessible and more quickly removable. All panel bodies are now made of aluminum with aluminum mouldings instead of wood.

Motor

The motor used is made by the Continental Motor Manufacturing Company. It has four cylinders cast en bloc and of the unit system construction, rated at 30 h.p.; bore $3\frac{1}{2}$ in.; stroke 5 in.

bracket bolted to the right side of the engine base, and held secure in its position by means of two steel straps and a large sized wing nut, which makes it easy to remove. The magneto is driven through a special spring coupling which relieves it



Stewart Series No. 2, Model B Express

The body is of all-wood construction; loading space inside, 84 in. long, 43 in. wide and 58 in. high

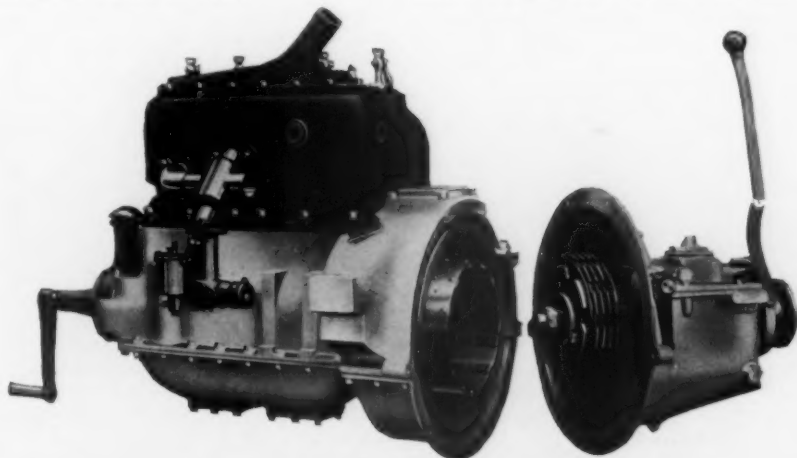
Bosch's high tension type, DU4-2 magneto is used. The point of ignition is set at $2\frac{1}{2}$ -in. advance measured on the circumference of the flywheel. With this set spark all ignition control levers have been eliminated. The magneto is mounted on a small

from possible damage through whipping and excessive speeds.

Transmission

The transmission is of the unit power plant unit, three speeds forward and one reverse. The transmission is bolted to the rear face of the engine base and no other supporting fixtures are required. It is made of No. 12 aluminum alloy. All transmission gears are made of $3\frac{1}{2}$ per cent. nickel steel containing .20 carbon. After the gears are cut they are carbonized in bone, double-heat treated and then drawn through oil to relieve the strain set up during the heating treatment. They have a $\frac{3}{4}$ in. width of face and cut with a 6-8 pitch. The gear ratios of the transmission are as follows: High sped 1:1; medium 1.7:1; low 3.35:1; reverse 4.35:1. The rear axle ratio is $5\frac{1}{2}$:1, so figuring from the engine to the rear wheels the total reductions are high 5.08:1; medium 8.64:1; low 17:1, and reverse 25:1.

The counter shaft of the transmission $1\frac{1}{4}$ in. diameter is made of .90 carbon steel. The main shaft is $1\frac{3}{4}$ in. diameter and made of the same material, which is given extremely hard treatment. Roller bearings with special adjustment cages support the main shaft at the front and rear.



Continental Motor Used on New Stewart Cars
Showing intake side of motor, dry plate clutch, carburetor, etc.

The transmission main shaft, where it passes through the case is provided with an adjustable stuffing box to prevent the leakage of oil into the clutch case.

Case hardened .20 carbon steel is used in making the transmission shifter finger, which moves the gears back and forth into position.

Clutch

Another new feature is in the clutch, which is a dry plate, multiple disc type, with one set of steel plates, and another set of Raybestos lined steel plates.

As a unit the steel plates, 3-32 in. thick, 8½ in. outside diameter and 6 in. inside diameter revolve with the engine which are

wheel mounts. All front axle bearings are lubricated by means of compression grease cups which are provided with locks to prevent their coming loose. Dust proof devices are furnished at all moving points to hold in the lubricant and exclude dirt and dust.

The spring seats are tilted slightly forward and designed to carry the axle at the correct position for producing the best effects in steering.

Adjustable stops are provided to regulate the throw of the front wheels in both directions. The distance between spring centres is 28 in. and the axle pads are drilled for 2 in. width of spring.

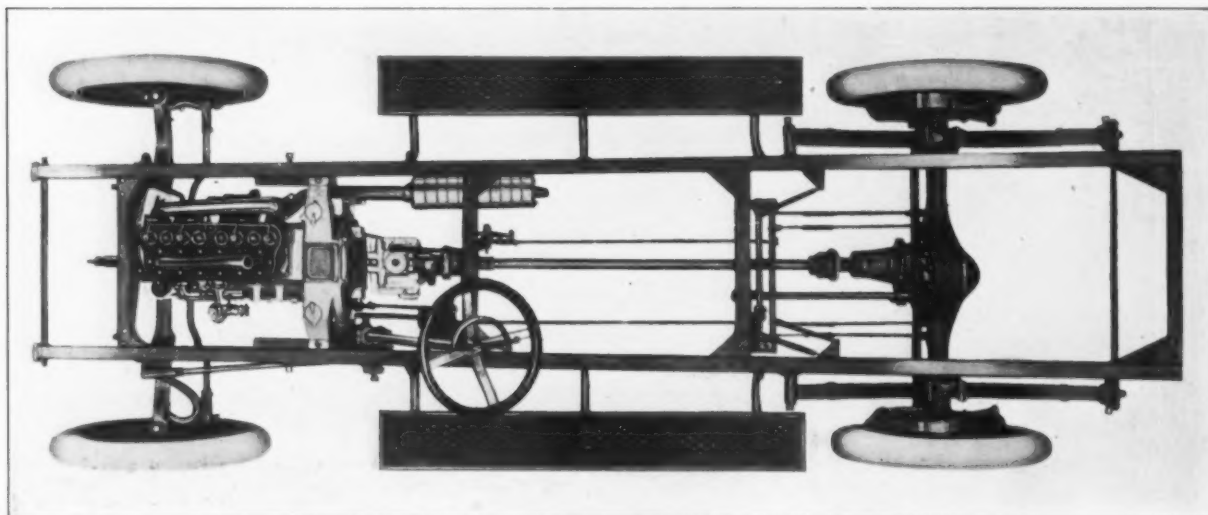
part is protected from dust and provided with grease cups.

Rear axle spring seats swivel on wide ground bearings, divided laterally and provided with grease cups. This relieves the rear springs from undue strains. Spring centres are 39 in. apart and the axle pads are drilled for 2¼ in. springs.

Roller bearings are used throughout the rear axle, in the wheels, the differential and the pinion shaft.

Steering Wheel

The steering wheel is of the worm and sector type which permits a new quarter of the worm wheel in contact with the worm after it becomes worn.



Stewart Series No. 2, Fifteen Hundred Pound Truck

Top view of chassis, showing disposition of motor, change gears, brake rods, etc. The frame tapers slightly to the front

machined, hardened and ground to a true surface, and the Raybestos lined plates, ½ in. thick, 8½ in. outside diameter and 6 in. inside diameter which are seasoned, baked and riveted to the steel disc revolve with the clutch shaft.

It has a total area of surface contact in the clutch to about 230 sq. in. There are five steel plates and four sets of Raybestos lined plates. With two coil springs and calibrated to the correct weight desired the clutch tension is produced. The total strength of the two springs is 275 lbs. when under the deflection at which they are used.

The clutch driving drum is bolted solidly to the flywheel of the motor. The clutch shaft is piloted into a drum with a No. 205 annular thrust bearing. A 1½ in. diameter, heat-treated clutch shaft is used. Clutch plates themselves need no lubrication and will not work satisfactorily if immersed in oil. They need no cleaning or washing off with gasoline. A drain hole is drilled in the bottom of the clutch case to prevent its being filled with oil.

Front Axles

The front axle which is 2 in. wide and 2¾ in. deep is forged from a single piece of I-beam section. It is then heat treated for toughening. In order to carry heavy loads and to render steering safe, the knuckles are forged from nickel steel. They are then hardened, ground and heat treated. Roller bearings are used for the

Rear Axles

The rear axle is of the full floating type made from a continuous piece of pressed steel. The sleeves for the bearings are 2 in. diameter, nickel steel and welded into position so as to well extend inside the axle spring seats. The rear coverplate is pressed steel and easily detached. It is ground to an accurate fit to the housing and provided with special moulded rubber gaskets.

The rear axle bevel gears are made of tough nickel steel, drop forged, machined, hardened, heat treated and ground. The bevel gear ratio is 5½:1, and the pitch of the teeth is five. The large bevel gear has sixty-one and the smaller, twelve teeth.

Two sets of brakes are used, the external contracting, 17 in. outside diameter and 2½ in. wide for the service brake, and the internal expanding 16¾ in. diameter by 2½ in., the emergency brake.

The brake rods have been shortened in this new series, making them the same length as the arch of the spring from the centre to the end. This preventing the brakes from automatically applying as the front and rear wheels stretch apart as they pass over a bump or through a hole. It relieves the strain on the rods.

Raybestos 2½ in. wide brake linings are used, each being held in place by twenty counter-sunk copper rivets. All brake levers and joints are provided with adjustments and anti-rattling devices. Every moving

A ratchet control is used on the steering post to prevent slipping due to road shocks and vibration. The wheel spiders are cast aluminum, buffed and polished. The wheels are wood, finished in oak and 17 in. outside diameter.

Frame

Carefully selected and analyzed .25 open hearth steel with never over .03 phosphorus and sulphur is used for the frames. The side rails inside no longer have an offset near the front, which was a source of weakness unless the width was increased at that point, in which case considerable extra weight had to be added. The side rails are now straight from front to rear, which are 4½ in. deep and 2 in. wide and 5-32 in. thick.

The overall width of the frame is 34 in. at rear end and 29½ in. at the front. The overall length from the centre of the front spring bolt to the rear of side rail is 175 in.

Springs

Front springs are 38 in. long, 2 in. wide, built up with eight leaves, and the rear springs are 50 in. long, 2¼ in. wide, built up with nine leaves. All spring eye bolts are ¾ in. diameter, giving large bearing surface and reducing the wear to the minimum. The leaves when assembled are coated with a compound of graphite and grease.

**Stewart Series No. 2, Model B Panel Body**

The body has aluminum panels. The loading space inside is 84 in. long, 45 in. wide and 58 in. high

Power is transmitted from the transmission to the rear axle by means of a Spicer drive shaft and two universal joints.

The propeller shaft is carefully heated nickel steel $1\frac{1}{2}$ in. diameter. The forward end has a slip joint to allow for slight forward and backward movement of the rear axle.

A honeycomb type of radiator which has high cooling efficiency, manufactured by Fedders Manufacturing Company has been installed. The radiator is supported entirely in the cowl back of the motor, and is in no way connected to the frame of the truck.

The radiator holds about 4 gals. of water, and has a frontal cooling area of 455 sq. in. with a total radiating surface of 20,450 sq. in.

The radiator fan has four blades with an outside diameter of 18 in. Runs on ball bearings and adjustment is provided to take up the slack in the $\frac{3}{4}$ -in. fan belt. The "V" fan belt is driven by a friction pulley on the outside rim of the flywheel.

A Powell muffler 5 in. in diameter and built up of eleven sections of 20 gauge pressed steel cups is used. It is light and strong and easily dissembled and cleaned. Front and rear muffler heads are of malleable iron.

Wooden wheels of the best grade of second growth hickory are used. The front wheels have twelve spokes each $1\frac{3}{4}$ in. wide with steel pressed wheel flanges $8\frac{1}{2}$ in. diameter. Rear wheels also have twelve spokes each of which is $1\frac{3}{4}$ in. wide. Every

spoke is bossed and has a double row of bolts. Pressed steel flanges $8\frac{1}{2}$ in. diameter are used. Tires are $34 \times 4\frac{1}{2}$ pneumatic, front and rear.

Terne Plate of the best grade is used in constructing the gasoline tank which has a capacity of twelve gal.; 11 in. wide, 11 in. high and 24 in. long. All edges are double seamed, soldered and the tank is reinforced by a plate being placed in the center of the tank to prevent rumbling. It has a 4 in. diameter filler hole with cover plate, making the tank easy to clean.

Panel Body

All the frame work, panel body, is made from the best grade of second growth ash, carefully selected and seasoned. Outside parts of the body are covered with hammered and stiffened No. 16 gauge sheet aluminum. The mouldings are also aluminum.

The ceilings and the inside of bodies are of white pine.

Prices

The price of the chassis with added equipment of glass front and mechanically operated horn and all improvements is \$1500. In this series twenty styles of bodies are made.

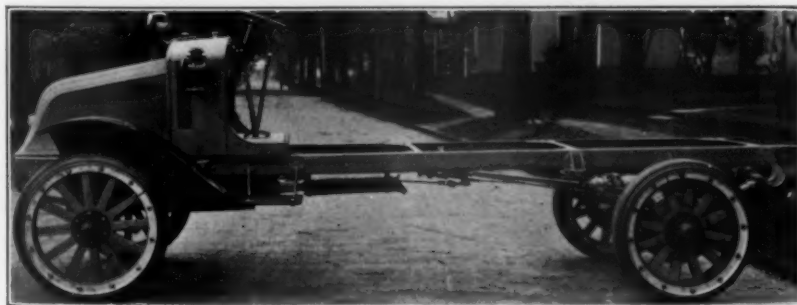
KREBS ONE-AND-A-HALF-TONNER HAS WORM DRIVE

THE 1915 model of the $1\frac{1}{2}$ -ton Krebs, produced by the Krebs Commercial Car Company, Clyde, Ohio, will be distinguished from its predecessors principally by its worm drive, chains being employed formerly.

The under hood motor is four-cylinder, four-cycle, water-cooled, $33\frac{1}{2} \times 5\frac{1}{4}$ in. Lubrication is constant level splash with plunger pump, ignition by high tension Bosch magneto; cooling by thermo syphon circulation with vertical flat tube radiator. The standard Krebs automatic variable governor is used, controlling both spark

**Krebs Model D Truck**

One and a half tons capacity; worm drive; four-cylinder motor under hood

**Krebs Model D Truck**

Stripped chassis, showing the filler caps for radiator, and fuel tank on dash, and single large searchlight. Left drive and center control

and throttle and maintaining any desired speed regardless of road conditions.

The leather-faced cone clutch is 16 in. diameter and has adjustable springs for gradual engagement. Selective three-speed transmission is used, having tapered roller bearings and 6-8 pitch, 1-in. face gears.

Frame is pressed steel channel $2 \times 5 \times 3-16$ in. Springs are self-lubricating semi-elliptic, $2\frac{1}{4} \times 40$ in. front and $2\frac{1}{2} \times 50$ in. rear. Wheels are artillery type with square spokes and S. A. E. bands; they are fitted with 36-in. tires, $3\frac{1}{2}$ in. front and 4 in. rear.

Left drive and center control is used. Steering gear is double worm and nut. Two wheelbases, 118 and 144 in., are offered. Chassis weighs 3950 lbs. Maximum speed is 15 m.p.h.

The Fremont-Mais One and a Half Ton Truck

By HUGH DOLNAR



THE Lauth-Juergens Motor Car Company, Fremont, Ohio, well known builder of motor trucks since 1905, is now placing on the market an entirely new design of motor truck, designed by Albert F. Mais, which embodies several distinctively novel features of real working value, and practical modifications founded on sound engineering values.

The present model of this new Fremont-Mais truck is one and a half tons paying load capacity, nominal; fully able, however, to handle two-ton loads on even bad country roads.

The marked feature of this new Fremont-Mais truck is the rear wheel drive, in which chains are displaced by internal gears, the bevel gears driving the pinion shaft, and the differential bevel gear being housed in the same globe shell with the main bevel gear. The whole length of the pinion shaft is entirely enclosed, and the driving wheel internal gear and pinion are enclosed in the same drum with the ordinary brakes, "Multibestos" faced, 15-in. diameter by 3-in. face; a grease-proof diaphragm in the brake casing separates the internal gear and pinion from the brake surfaces, so that the rear wheel driving gear can be packed with heavy grease without reducing the ordinary brake efficiency.

An emergency brake drum, 10-in. diameter by 3-in. face, is placed on the propeller shaft close in front of the bevel pinion ball bearing, also wholly enclosed.

Radius rods, like the chains, are wholly eliminated, the propulsion effect of the drivers being transmitted to the chassis frame directly through the rear half-elliptic springs, which are jointed to the chassis frame in front and linked to the chassis frame in the rear, so that the entire rear wheel drive is clean, simple, and wholly enclosed in dust-proof steel casings.

This new Fremont-Mais truck driving system is in strong contrast to both the chain-driving and the bevel-gear driving in ordinary motor truck.

Mr. Mais has done more than to simplify and enclose his driving elements, good as this work is, and vital as is the necessity of enclosing all the driving mechanism of a motor truck in dust-proof casings.

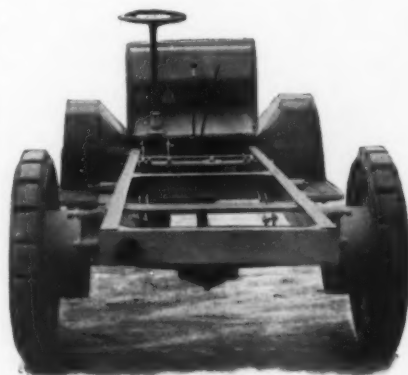


Fremont-Mais Ton and a Half Truck
Rear wheel, brake drum and internal gear housing; and rear axle, drum cover and countershaft internal gear driving pinion.

The perfecting feature of the Mais truck drive is found in the placing of the internal gear drive pinion shaft in the rear of the rear axle, and supporting the bevel pinion ball bearing in a finished seat bored in a middle enlargement of the stationary rear axle itself, thus ensuring the permanence of the bevel gear and bevel pinion relative positions. There is only one right location for a pair of bevel gears with relation to each other, and if the pair of gears can be placed in that right position and held there permanently, sure and certain, and the gears are enclosed and can run packed in grease, then a pair of bevel gears may be expected to work well and last long; especially when, as in this new Fremont-Mais truck drive, the bevel gear is applied to an internal gear pinion shaft, internal gear speed reduction $5\frac{1}{2}$ to 1, so that the bevel gear tooth load is reduced by the same ratio on smooth roads, and vastly more than that when the gear is called upon to resist the shocks of bad road propulsion.

Nothing is exposed to dust access, everything is enclosed in substantial steel casings and housings, everything that needs lubrication is packed in heavy grease, and the bevel gears are so supported that they are certain to stay right if they are correctly placed to begin with, and, which is of first

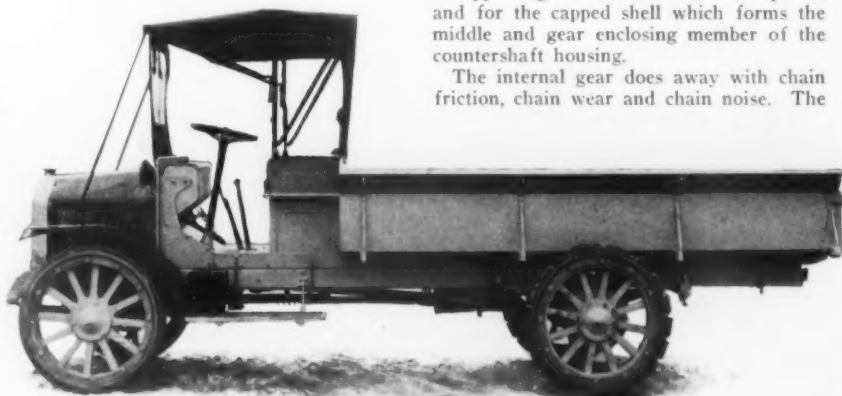
plane section construction drawing given herewith. Nothing short of breakage can change the relative positions of the bevel pinion and the bevel gear which are supported in ball bearing of liberal dimen-



Fremont-Mais Ton and a Half Truck
Rear end elevation

sions. The highly desirable bevel gear support here shown is gained by placing the pinion shaft at the rear of the rear axle, and thus bringing the body of the rear axle in such position that it can serve as a supporting member for the bevel pinion and for the capped shell which forms the middle and gear enclosing member of the countershaft housing.

The internal gear does away with chain friction, chain wear and chain noise. The



Fremont-Mais Ton and a Half Truck
Side view, complete with top

importance, the bevel gear and differential gear are subjected to light loads only, while the hard work is taken by internal spur gearing, the strongest form of toothed gear known in the art.

In a word, this new truck drive, the last one of a long series of approximations designed by Albert F. Mais, is a piece of wise and thoroughly sound engineering, is beyond criticism, and is perfectly certain to show on the road very marked superiority in point of reliability.

The highly valuable feature of supporting the propeller shaft bevel pinion in a bored seat in the enlarged middle portion of the rear axle forging is clearly shown in the reproduction of the horizontal mid-

elimination of the struts, which cannot possibly be given such centers as to make them give the rising and falling rear axle movements exactly co-ordinated with axle movements up and down due to the natural spring action, gives the springs entire freedom in working. The dust-proof steel enclosure of all moving parts ensures clean lubrication and consequent long life of the driving mechanism, while perfect support of the bevel pinion and the bevel gear which drive the countershaft under a light load and with the certainty of abundant lubrication, ensures continued retention of the bevel gear and bevel pinion positions given them originally by the assembler.

Springs

These are half-elliptics, front and rear.

The front spring specifications are: Length, 42 in., width, $2\frac{1}{2}$ in.; number of leaves, nine; thickness of leaves, graded, $\frac{3}{8}$, $\frac{5}{16}$ and $\frac{1}{4}$ in., one leaf $\frac{3}{8}$, three leaves $\frac{5}{16}$ and five leaves $\frac{1}{4}$ in. thick. The front springs are jointed in front and linked in rear, to the chassis frame.

The rear springs are 48 in. long, width 3 in., thirteen leaves, $\frac{7}{16}$, $\frac{3}{8}$ and $\frac{5}{16}$ in. thickness. The rear springs are jointed to the chassis frame in front and linked to the chassis frame in the rear.

Principal Dimensions

Wheelbase, 128 in. and 144 in., to take bodies having load spaces 10 ft. 6 ins. and 12 ft. 6 ins., respectively. The front wheels



Fremont-Mais Ton and a Half Truck
Front end elevation

are 36 in. diameter by $3\frac{1}{2}$ in. tread, rear wheels 36 in. diameter by 5 in. face. The gage of the front wheels is 58 in. center to center of tires, gage of the rear wheels is 60 in. center to center of tires.

The Buda motor, piston diameter $3\frac{3}{4}$ in. x $5\frac{1}{2}$ in. stroke, shows 28 b.h.p. at 1000 r.p.m. The Warner sliding gear, selective, gives three forward speeds and one reverse, the gear case and crank case being united to make one power unit assembly, three point suspension, with center control mounted on top of the speed change box. The propeller shaft universal joints are $5\frac{1}{4}$ in. working diameter, wholly enclosed, packed in grease, and drive a propeller shaft tube $2\frac{1}{4}$ diameter, wall thickness $\frac{3}{16}$, leading through the rear universal joint to the pinion shaft, bearing two circles of 11/16 diameter balls, ball casing seated in the



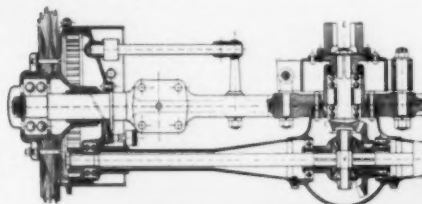
Fremont-Mais Ton and a Half Truck
Chassis, Side Elevation



Fremont-Mais Ton and a Half Truck
Rear axle and countershaft housing assembly, rear view

rear axle itself; the bevel pinion is 4, diametral pitch, case-hardened, eighteen teeth, the countershaft bevel gear, 4, diametral pitch, has thirty teeth. The differential has two bevel pinions, 6, diametral pitch, which have fourteen teeth, while the bevel gears, 6, diametral pitch, have twenty-two teeth; the pinion shafts are squared in the balance gears, are $1\frac{1}{4}$ in. diameter and run in circles 11/16 in. diameter balls. All these countershaft gears are case-hardened. The internal gears and pinions are 4, diametral pitch, stub tooth, 5, tooth length, case-hardened, and the driving wheel internal gears, 4, diametral pitch, $1\frac{1}{4}$ in. face, high carbon and heat-treated, are as hard as can be machined, are dust-proof enclosed, and run packed in heavy grease.

The front axles, cylindrical, are $2\frac{1}{4}$ in. diameter, and the wheel is carried on two



Fremont-Mais Ton and a Half Truck
Reproduction of construction drawing: section of rear axle and drive in horizontal mid-plane

circles of ball bearings inside, balls $\frac{7}{8}$ in. diameter, and one outside circle of balls, $\frac{1}{4}$ in. diameter.

The rear axles are cylindrical, $2\frac{3}{4}$ in. diameter by $3\frac{3}{4}$ in. long, plain cylindrical bearing inside, with two circles of $\frac{7}{8}$ in. diameter balls, placed $1\frac{1}{2}$ in. center to center of balls, total length of rear wheel bearing $7\frac{3}{4}$ in. The cylindrical inside bearing of the rear wheels is in a "Non-gran" bronze bushing, the whole rear wheel bearing is dust-proof and grease packed.

On the Road

May 9, 1914, a Fremont-Mais ton and a half truck, weight of truck unloaded 3810 lbs., weight, as shown in illustration, loaded with 4000 lbs. of gravel in sacks,

left the Fremont factory, and was driven on high gear at 14 m.p.h., on the Toledo-Norwalk gravel pike, to Fremont, and thence to the Godfrey Quarry, where there is a stiff and badly rutted grade into the bottom of the quarry. The ordinary brakes gave ample control down the grade, and the truck, with its 2-ton paying load and three passengers, Mr. Mais driver, a mechanic, and Hugh Dolnar observer, pulled up this rough steep incline out of the Godfrey Quarry with perfect steadiness on second and low speeds. On a fair brick pavement the truck, 2-tons paying load, touched 23 miles on high gear, and on a paved grade, about 8 to 10 degrees incline on high gear, with ease. Then the truck was driven to a bad road unpaved hill, about 15 to 18 degrees angle, and made the trip down and up, under easy control, and strong drive up on second and low gear, a very stiff climb and very bad road surface.

The front seat rides easy, much easier than the observer expected on bad roads, and perfectly easy at 15 m.p.h. on fair



Fremont-Mais Ton and a Half Truck
Rear axle and countershaft housing assembly, showing enlarged rear axle support of the propeller shaft bevel pinion.

roads. The drive is silent, and has plenty of power to handle 2 tons paying load under all conditions tried.

The equipment was Holley carburetor and Eismann magneto, and the motor worked perfectly at all times.

Three Peerless trucks began their second year's run on April 15th between Sanger and Hume, Cal. Each truck is fitted with well upholstered and easy riding seats and carries thirty passengers and travels every day over 56 miles of rough mountain road on which there are 35 miles of steep grades ranging from 15 to 32 per cent.

New Design One and a Half Ton DeKalb Truck



A NEW model is being brought out by the DeKalb Wagon Company, DeKalb, Ill. Taking the car as a whole one is impressed with the fact that while no experiments in the way of radical departure from standard practice have been embodied in the design, it affords quite a few practical and well-thought-out details.

The Motor

The motor is four-cylinder four-cycle, 4 $\frac{1}{8}$ -in. bore and 5 $\frac{1}{4}$ -in. stroke, and is a Continental product. The cylinders are L-head type and cast en bloc. The crankshaft is carried on three bearings; lubrication is of the splash and force feed type, which latter is effected by means of plunger pumps. Oil tubes, passages and connections are inside the motor crank case. Motor is governed at a speed of 1050 r.p.m., has a piston displacement of 260.64 cu. in. and develops 27.25 h.p. according to the S. A. E. rating.

The electric current is produced by a Mea high tension magneto. Ignition is controlled by lever, placed on top of the wheel. Carburetor is double jet, non-water jacketed type, easily adjusted and controlled. Throttle control is effected by lever on top of steering wheel and by a foot accelerator. Two separate throttle valves are used, arranged in the intake passage one above the other; one of these throttle valves is connected with the governor, while the other is connected to hand and foot controls.

The cooling is maintained by an ample sized vertical flat tube radiator, assisted by a centrifugal pump and a four-blade fan of propeller construction.

The motor is mounted rigidly on a subsidiary frame, which is secured to the main frame by two hinged joints at front and by a single joint at the rear, giving a perfect three-point suspension. The feature of this construction is that the forward end of the transmission also rests on this sub-frame, thus making a three-point support of the jack shaft and transmission unit.

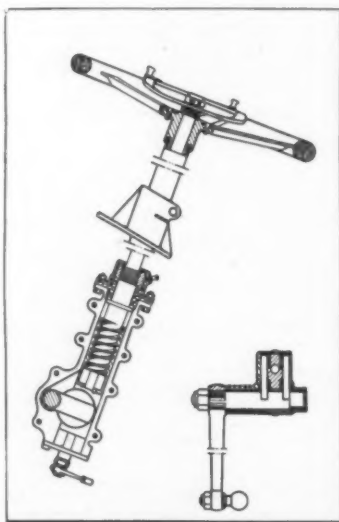
Clutch, Transmission and Jack Shaft

The clutch is pressed steel cone type, faced with leather and fitted with auxiliary springs. The spring pressure allows a low unit pressure and transmits the torque of the motor without being "harsh" and difficult in its operation. Withdrawal is effected by a pedal, throwing out two ball bearings, mounted on a yoke; these rollers in their turn act on a disc and throw the clutch out. This construction is very simple, fool-proof

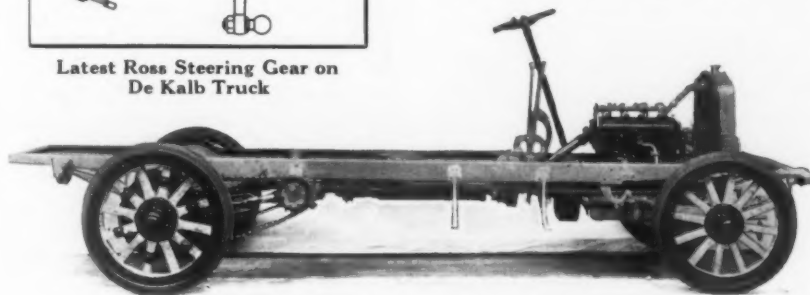
and reliable. A smooth acting brake is applied on the clutch.

The clutch shifting and braking mechanism is mounted on the sub-frame, underneath the clutch shaft, in adjustable brackets to take up wear of the brake lining. As the clutch shifting shaft is located low, the service brake arm, which has to extend upward comes in a more convenient position. There is a double universal joint between clutch and transmission to compensate for errors in alignment. This joint is of the block and trunnion type, completely enclosed and filled with grease.

The transmission is three speed selective type, Covert make. Gears and shafts nickel steel, carbonized heat treated and ground. Bearings are of Hyatt high duty roller type. The faces of the teeth are 1 in. wide and the pitch of the gears is 6. The transmission system may be considered in three units, the third member, the three-speed gear set and the jack shaft. The third member is bolted rigidly to the transmission and consists of a seamless steel tube and a spherical joint, thus making a ball-and-socket support. The ends of jack shaft are supported in like manner, one ball is provided for the frame bracket and the other for the radius rod. This construction, while unique in America has followers among the truck engineers. The merits of this arrangement are a perfect alignment,

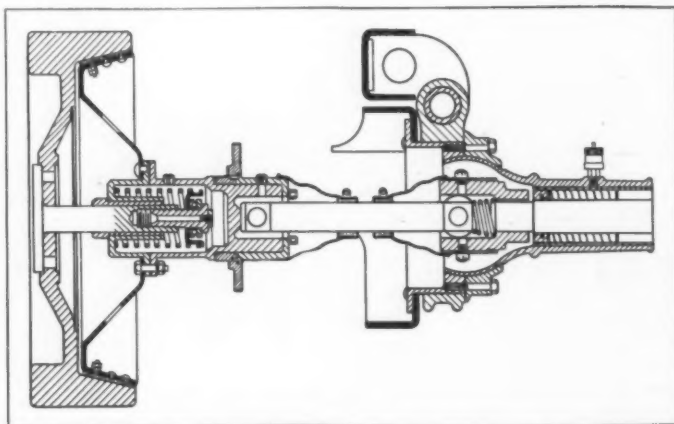


Latest Ross Steering Gear on De Kalb Truck



De Kalb Three Thousand Pound Truck

Side view of chassis, showing the sturdy construction throughout



Section of De Kalb Clutch

a flexible frame, no distortion, no undue stresses, and a clean cut appearance.

The jack shaft is full floating type. A double annular ball bearing outside the housing takes care of the load. Shafts could be easily removed for inspection.

The Drive

Power is transmitted to the rear axle by means of side chains and sprockets. The chain speed is approximately 1000 ft. per min. on high gear. It has a large pitch of 1 $\frac{1}{2}$ in., rollers $\frac{3}{4}$ in. in diameter, and an ultimate strength of 18,000 lbs. The total reduction is 6.831:1 on high gear, and still the smaller sprocket has the greatest number of teeth permissible.

Reactions are taken through radius rods to the chassis frame, eliminating all driving

stresses from the rear springs. The front end of the radius rod is mounted on a spherical seat on the jack shaft tube while the rear end is hinged to the brake spider to take care of any lateral strain. The effective length of the radius rod can be easily adjusted and locked by means of check nut. When car is under full load, radius rod sets parallel with frame and power is transmitted to rear axle through an exactly straight line.

The front axle is one-piece I-beam forging with Elliott type steering head and pivot pin bearings in knuckle. Steering pivots are inclined and knuckle arm is placed above axle. The front axle clears ground by $9\frac{3}{4}$ in. with 34-in. wheels. The rear axle is a solid drop forging with $1\frac{3}{4}$ x 3-in. rectangular section. Roller bearings are used throughout.

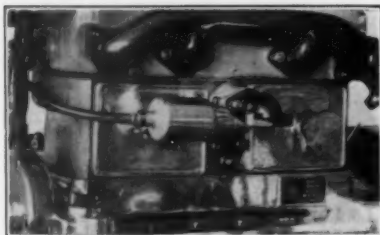
Control

The steering gear is nut and screw type, latest production of the Ross Tool & Gear Company, this gear featuring non-split steel sleeve, single-threaded screw, tremendous bearing surfaces and no offset leverage. The ratio on this gear is 8:1.

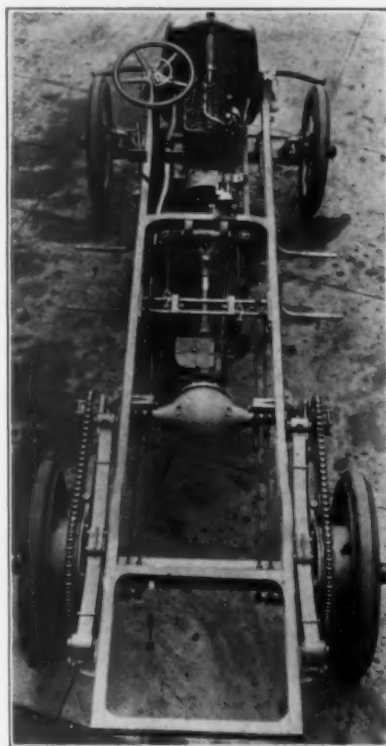
The steering column, instead of being attached to the frame in the usual manner by bolts, is fixed direct to the spring bracket, and is further stiffened by being secured to the steel toe board. The gear is very accessible and can be taken off without disturbing any other part of the construction.

Wheels, Brakes and Springs

Front and rear wheels are made of carefully selected wood, with patented Schwarz interlocking spokes. The front wheel is $34 \times 3\frac{1}{2}$ S. A. E. single; the rear wheel is 35×5 in. S. A. E. single. Two separate and independent braking systems are used. Both service and emergency brakes operate on drum at rear wheel, and they are of the internal expanding type. The brake segments are made of steel castings, lined with Raybestos, are 16 in. in diameter and $2\frac{1}{2}$ in. wide. The total braking surface is approximately 485 sq. in. The whole braking mechanism is supported on a spider, which acts freely on the axle, and forms the cover for the brake drum. A very efficient equalizing device is inter-



Pierce Speed Controller on De Kalb Truck



De Kalb Three Thousand Pound Truck

Top view of chassis, showing location of Continental motor, transmission on jack shaft, left drive, etc.

posed to produce equal operating forces on the brakes. The forward ends of the rear brake rods are so located that spring play will not effect application of the brakes.

The springs are semi-elliptic front and rear, and the latter is specially long to give the maximum of easy riding to all loads. The front springs are 40 in. long and $2\frac{1}{4}$ in. wide; the rear springs are $50\frac{1}{2}$ in. long and $2\frac{1}{2}$ in. wide. The springs are shackled, take no part in the drive of the car, and are very free and flexible. The shackle pins are $\frac{3}{4}$ in. in diameter, and made from $3\frac{1}{2}$ per cent. nickel steel with integral grease cups.

Frame, Equipment, Load Distribution, Etc.

The frame is pressed steel, 5 1-16 in. deep heat treated. Chassis equipment includes tires, driver's seat, dash and foot boards, front fenders, running boards, side and tail lamps, horn and a set of tools, and a seamless gasoline tank, which holds 20 gals.

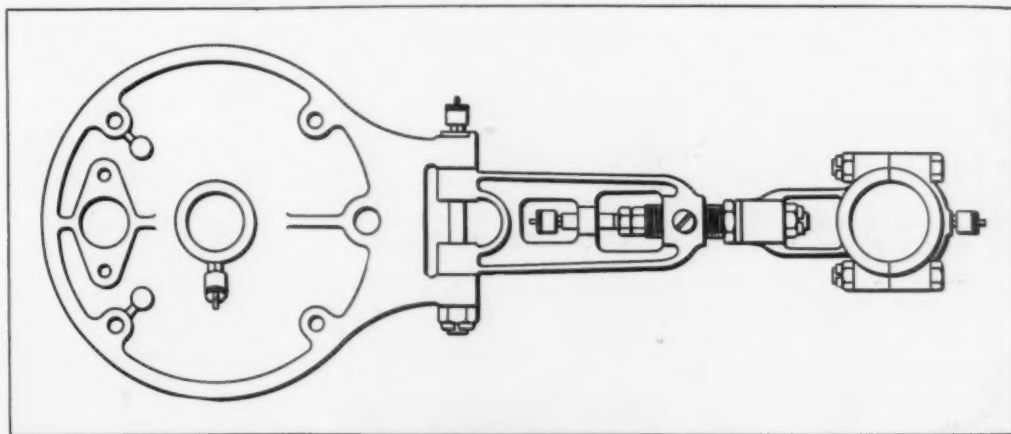
The wheelbase is 134 in. standard and 144 in. special, with a 56 in. tread. The chassis over all is 193 in. long and 70 in. wide. Length of body from 9 ft. up to 11 ft. Top of frame is 30 in. from ground when not loaded.

The total admissible load on chassis, including body and load, is 4050 lbs., speed 14 m.p.h., governor controlled. Total weight of the chassis is 4185 lbs., 2125 lbs. of which comes on the front tire and 2060 lbs. on the rear tire.

The frame carries a substantial front bumper for protection. An improvement is the sheet steel dash and toe board, also seat box, which makes a neat and substantial looking job.

The price of the chassis is \$1800 f.o.b. DeKalb, Ill.

During a recent fire at the State Normal, at Amarillo, Tex., a fire truck, built on a stock Cadillac chassis and carrying a total weight of 6000 lbs. including hose, ladders, chemicals, and tools, made a remarkable run covering a distance of 23.2 miles in 31 minutes. The last 9 miles were covered in 10 minutes and the average speed was 46 m.p.h. The run was made over country roads, over hills, around a number of short turns and through canyons.



De Kalb Adjustable Radius Rod
Note ample provision of grease cups

Mogul Adds a Two-Tonner

WHILE the offering of the Mogul Motor Truck Company, of St. Louis, Mo., will contain two-ton models for drayage and hauling, and a six-ton for coal, material, lumber, etc., the former, being new, is considered the more proper object for description, the illustration of the six-ton machine being deemed sufficient on account of the public's acquaintance with it. These two two-ton models are designated as model "L" and "L.L." and differ only in the length of the wheelbase.

Motor

The motor is a four cylinder, four cycle, water cooled type, having $4\frac{1}{4}$ in. bore, $5\frac{1}{4}$ in. stroke, built by the Continental Motor Manufacturing Company, and known as their model "C."

Ignition is by Eisemann high tension magneto with fixed spark, being controlled by a switch on the dash board. The Stromberg B4 carburetor is used and is controlled by an accelerator pedal. The steering wheel, being clear of all control elements, gives maximum simplicity. The radiator is of the vertical tube type and is of generous proportions. It is mounted on springs as shown.

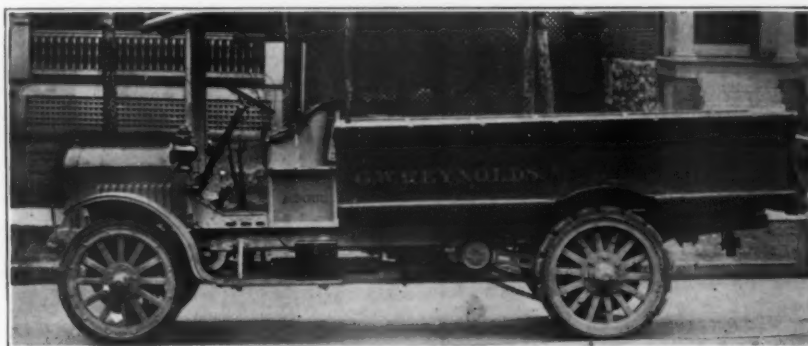
Clutch and Transmission

A cone clutch is mounted in the flywheel and is supported by an extension of the crank shaft. The thrust is self contained and is taken by ball thrust bearings. The forward universal joint is built into the clutch, while the drive shaft is $1\frac{3}{4}$ in. in diameter and made from vanadium steel. The motor and clutch are mounted on a three point support sub-frame.

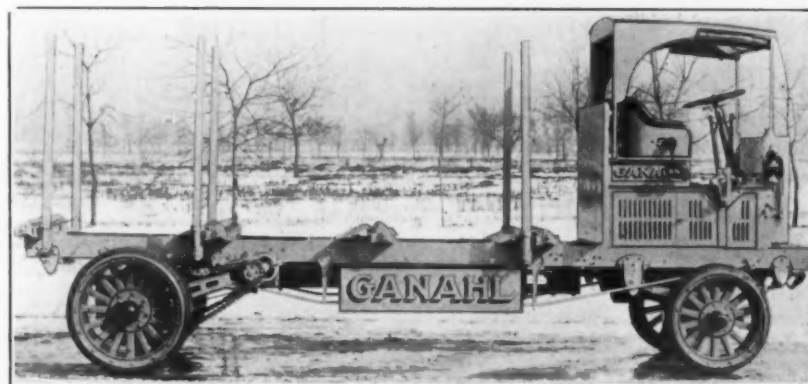
The transmission is of the jaw clutch type, all gears remaining in mesh and are mounted on roller bearings, the shafts being mounted on self-aligning imported double

row ball bearings. It is mounted on the main frame at three points and gives three speeds forward and one reverse with direct or high speed. The gears being in

meshes at all times give the full strength of their working face and transmit power only, while the sliding jaw clutches make the speed changes.



Side View of the Two-Ton Mogul. Price, \$2360



Mogul Six-Ton Special Lumber Truck



Mogul Six-Ton Coal Truck

The front axle is a one piece drop forging of I-beam section. The rear axle is a vanadium steel, heat treated forging of rectangular section $2 \times 3\frac{3}{4}$ in. and is equipped with roller bearings.

Both service and emergency brakes are of the internal expanding type located side by side in the rear wheels and are thoroughly protected. The brake drums are 17 in. in diameter while the bands are $2\frac{1}{2}$ in. wide and are adjustable. They are supported both radially and laterally at four points. These supports also carry the adjusting screws. The radius rod which has been used for a number of years by the Mogul Company, is illustrated herewith.

Springs and Frame

The springs are made of alloy steel, the front being 44 in. long and 3 in. wide, while the rear are 48 in. long and 3 in. wide; and are mounted outside the frame.

The frame is of pressed steel channel $6\frac{3}{4} \times 2\frac{1}{2}$ in., heat treated and braced by five heavy cross members. A sub-frame providing a three point support is used for mounting the engine.

The wheelbase for model "L" is 138 in. with 58 in. track and 36×5 front tires and 38×6 single or $38 \times 3\frac{1}{2}$ dual rear tires.

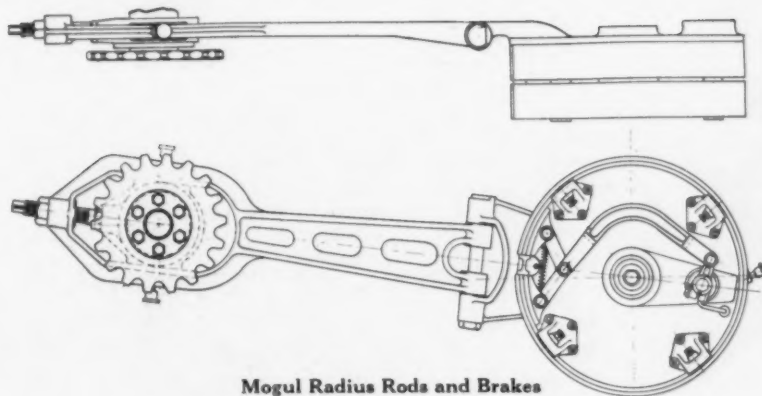
Control and Other Details

The steering gear is worm and wheel type having an 18-in. hand wheel, and is arranged for fore and aft steering. It is mounted on the left side, while the control levers are mounted in the center, thus offering left hand steer with right hand control.

The frame affords a maximum loading space of 5 x 11 ft.; while the frame when loaded is 31½ in. from the ground.

Model "LL" differs from model "L" in that it has a wheelbase of 148 in. and affords a maximum loading space of 5 x 13 ft.

Model "L" chassis is listed at \$2360 in lead while model "LL" lists at \$2400 in lead.



Mogul Radius Rods and Brakes

The New Aetna Two-Ton Worm-Drive Truck



AETNA Motor Truck Company is incorporated under the laws of the State of Michigan, with a capital of \$150,000 to manufacture a two-ton worm drive truck, same being composed of standard units, and specializing the one capacity. The proposed output for the first year is two hundred.

The officers of the company are J. George Wagner, president and general manager; Ernest E. Kinney, vice-president; William A. Eldred, secretary; John J. Wilson, treasurer; and George Humbert, director. The factory is located at Richmond Avenue and East Grand Boulevard, Detroit, Mich.

The motor is a Hazard, L head, with 4-in. bore and 4½-in. stroke, developing 25 to 30 h.p. Ignition is provided for by an Eisemann automatic magneto, while the carburetor is a Schebler model R, with a governor limiting the car speed to 15 m.p.h. A large capacity radiator is mounted on shock absorbers.

Clutch is a No. 50 Brown-Lipe 24 plate multiple disc type, plates lined with Raybestos. Transmission, also a Brown-Lipe product is selective sliding gear type, three speeds forward, 1 in. face, extra strong and running in oil.

The rear axle is David Brown & Sons' imported worm and worm gear, worm mounted on imported Rineland bearings. Worm wheel and differential are mounted on double rows of imported Rineland annular bearings, with all mounted in a dome shaped housing of Isaac G. Johnson one piece steel casting. Entire rear axle runs

in oil bath, and all bearings are lubricated with oiling devices. Castellated nuts and lock washers are used throughout. The front axle is I-beam type, one piece forg-

center. Two electric dash lamps and a tail are provided.

Two wheelbases, 130 and 144 in., are furnished, with longer ones special. Tread

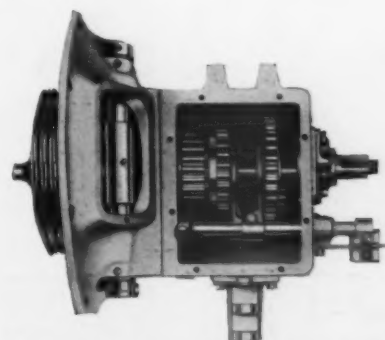


Aetna Two-Ton Worm-Drive. Price, \$2250

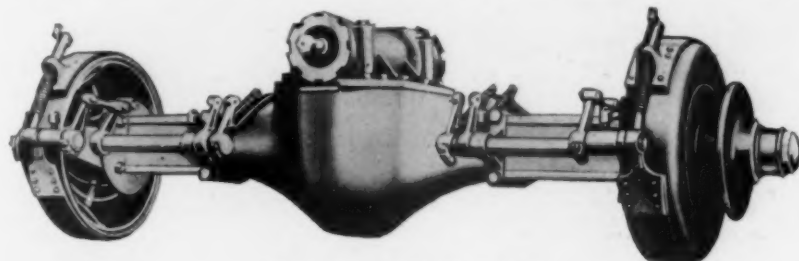
This price includes stake or express body, the chassis with driver's seat being listed at \$2150. This machine is composed entirely of standard units

ing, 17½ x 3 in. with integral spring pads and 1 31-32-in. spindles. Two sets of standard taper roller bearings are fitted. Both brakes operate on rear wheel drums. Wheels are 36-in. artillery type, fourteen 2-in. square spokes fitted with 36 x 3½ tires front and 36 x 5 rear, duals optional in rear. Springs are semi-elliptic, 40 x 2½ in. front and three-quarter-elliptic 54 x 3 in. rear, thirteen ¾-in. leaves. Frame 4½ in. deep, 3-16 in. thick and 4 in. wide.

The Ross worm steering gear is placed on the left side with control levers in the



Brown-Lipe Multiple-Disc Clutch and Three-Speed Transmission of the Aetna Truck



Aetna Worm-Drive Rear Axle

is 56¼ in. front and 58¼ in. rear. Platform is 72 in. wide, with a length of 132 in. on the small wheelbase and 156 in. on the large. Equipped with tool box, tools, jack, battery, battery box and cab seat, the chassis is catalogued at \$2,150, with a stake or express body at \$2,250.

Croce Commercial Cars



THE Croce Automobile Company, Asbury Park, N. J., has just placed on the market a new worm-driven truck of two tons carrying capacity. One of the novel features of this model is the seating of the driver beside the motor, saving the space usually taken up by the bonnet or hood, and at the same time not making the driver's seat very high above the ground.

Motor, Clutch and Transmission

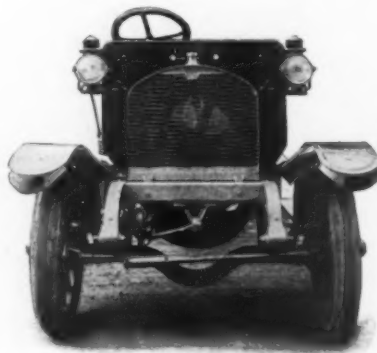
The motor is of the well-known Wisconsin type, equipped with Bosch magneto. The transmission is of Brown-Lipe make, the shafts revolving on roller bearings.

The hood is right in the centre of the car, so that the driver has plenty of room to get in and out on both sides of the car. There is also enough room on the other side of the motor for the assistant driver. This method of placing the driver's seat gives a clear gain of about 30 in. in loading space. By lifting the hood which covers the motor, every part of the motor is accessible.

Other Details

The total length over all from front to rear is 16 ft. Diameter of circle in which vehicle can be turned is 40 ft. Length of

loading platform back of the driver's seat to the end of the frame is 10 ft. 6 in.; on account of the axle being only 35 in. from the center to the rear of the frame, it can take 2 ft. more overhang above the frame, which would give a loading space of 13 ft.

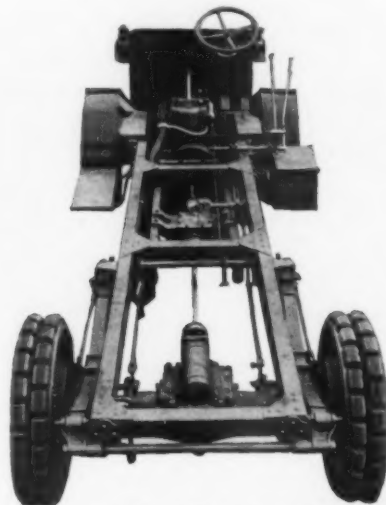


Croce Two-Ton Worm-Drive Truck

Front view of the new model, showing Kells radiator, spring horns, fenders and steering mechanism.

without having any too much overhang; this is one of the special features of the trucks. Width of loading platform from 40 in. to 80 in. Distance from front of the car to rear of the driver's seat is 5 ft. 6 in.; distance from rear of the seat to the end of the frame is 10 ft. 6 in. From the center of the rear axle to the end of the frame is 35 in. Height of truck from the

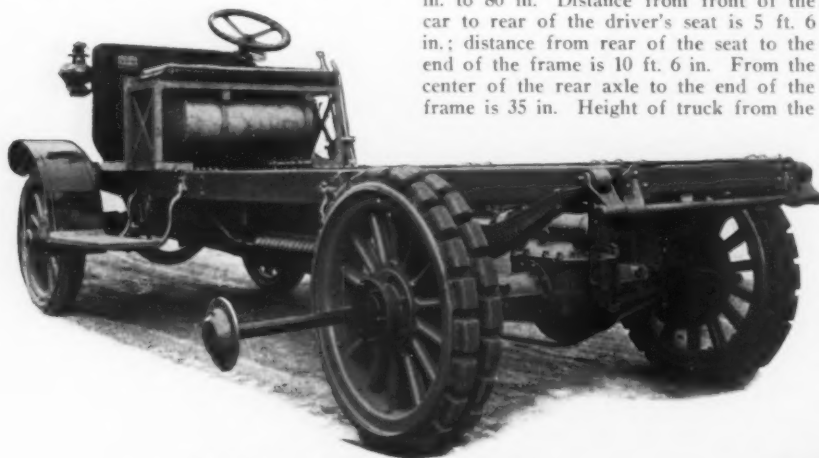
ground when empty is 34 in., loaded is 31 in. Truck is made to run with Pierce speed controller 15 miles per hour. Total weight of the chassis 5100 lbs. Percentage of weight, empty or loaded, 50 per cent. front and 50 per cent. rear, which is the greatest feature of the trucks. Frame is pressed steel, 6 in. in diameter with 3-in.



Croce Two-Ton Worm-Drive Truck

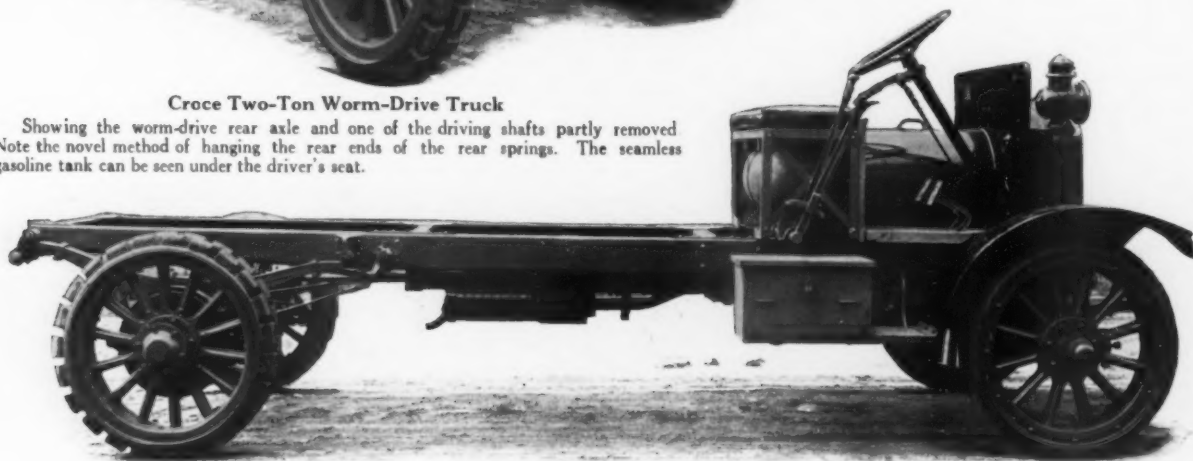
A rear top view, showing driving members, location of motor, transmission, control levers, and showing staunch frame design.

flange. Tapered each end. Springs are 3 in. wide, and have bronze bushings for replacement of wear. Spicer universal joints are used on the drive line. Kells radiator is used with riveted body and solid bronze casting on the bottom. Rear axle is worm driven with roller bearings throughout, cone clutch with special designed housing for clutch throw, which contains no wearing parts when car is in motion. Front and



Croce Two-Ton Worm-Drive Truck

Showing the worm-drive rear axle and one of the driving shafts partly removed. Note the novel method of hanging the rear ends of the rear springs. The seamless gasoline tank can be seen under the driver's seat.



Croce Two-Ton Worm-Drive Truck

Side view of chassis. Note the position of driver's seat; so that the motor is not in the driver's way, yet great economy of space is possible

rear tires—these specifications are standard on one and a half and two ton trucks except on one and a half ton truck the springs are lighter and the front and rear axles are lighter, and has 36x4 tires on front and 36x3½ dual on the rear, or 36x7

single rear; two-ton truck has 36x5 front and 36x4 dual rear. The width of the springs remains the same, except there are more leaves.

All of the Croce trucks have the same design and have gained great reputations

wherever shown. The price of the new one and a half ton worm-drive truck has not yet been determined, but the two-ton size will sell for \$2600 and the one and a half ton will be in the neighborhood of \$2000.

Care and Repair of Truck Radiators

By MURRAY FAHNESTOCK



THE radiator is one of the first parts to catch the eye of the man-in-the-street, when he glances at the "business end" of a motor truck. The radiator is also one of the first parts to be damaged, if the truck runs into something or if a wagon backs into the truck.

A small leak will sink a great ship, and a small leak in a radiator will cause considerable trouble, and possibly expense, if it is not repaired. It is true that the truck can be kept running without harm, when the radiator is leaking, if the driver fills the radiator frequently with water. But the truck may be in places where water is not easily available, or the driver may, and often does, forget, so that the water supply may be allowed to become low, thus damaging the motor or perhaps even cracking a cylinder, if a fresh supply of water is suddenly added. If non-freezing solutions are used, a leaky radiator means a constant loss of costly solution; and also causes variations in the proportions of the solution, if water alone is added.

What to Do if Water is Gone

If all the water in the radiator is boiled away, the object of the driver should be to cool the motor gradually; the slower the better. The hood over the motor may be removed to facilitate cooling. If the pistons have seized, kerosene should be poured into the cylinders through the priming cups or through the spark plug holes. After the motor has become cooler, the water may be added slowly, warm water being preferable.

It is better to add water to the radiator while the motor is running. This distributes the water through the cooling system gradually, and avoids the strains that would occur from the contraction due to sudden cooling. The wire gauze strainer should always be left in place when the radiator is being filled, as the strainer prevents the radiator being clogged up with dirt. The strainer should be removed and washed out from time to time, in order that it may be maintained in effective condition. The overflow pipe should also be washed out occasionally, for if it becomes clogged up there is a possibility that the radiator may be strained by the expansion of the heated water.

Cleaning the Radiator

The radiator may be cleaned of grease and lime by filling it with a solution of soda. About two pounds of soda per gallon of water should be used, and the solution should be left in the radiator for about a day, while the truck is in use. Then the

solution should be thoroughly washed out by removing the lower hose connection from the radiator and running a stream of water from a hose through the filler opening.

Boiler compounds can also be used, but the compound must be adapted to the water that has been used in the radiator. A couple of tablespoonfuls of compound should be added to the water in the cooling system and left in the motor and radiator for several days before being washed out with a hose.



Repair Bolt for Cellular Radiators

If the radiator leaks, it should never be filled with bran or flour, in the hope that they will swell and stop the leak. They will clog the entire radiator to such an extent that it will be an almost impossible task to clean it out.

For repair purposes, radiators may be divided into two general classes, the tubular and the cellular types. Roughly speaking, we may classify as tubular those that have straight vertical tubes, through which the water flows. The cellular type has horizontal tubes, or spaces, through which the air circulates.

Soldering the Radiator

If one of the tubes of a tubular radiator leaks, the radiator should be removed from the truck and soldered. But if this cannot be done, it is sometimes possible to remove some of the metal fin and to bandage the tube with tire tape. If the top of the tube

is accessible, through the filler cap, or if the top of the radiator can be removed, it is often easy to push a cork or wad of waste saturated with Smooth-on iron cement below the leak, and then to plug up the top of the tube with another cork. This makes an effective roadside repair that will last a long time. If the tube is not accessible from the top, it may be necessary to remove the radiator and to cut a hole in the bottom of the radiator, through which the damaged tube may be plugged. After plugging the tube, a small plate must be soldered over the hole cut in the bottom of the radiator.

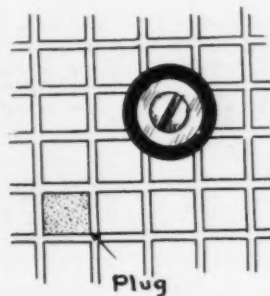
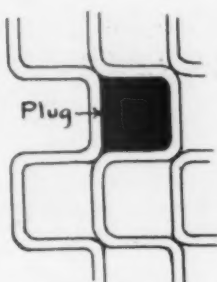
Radiators of the cellular type are generally easier to repair, as it is only necessary to plug up the openings of the air spaces into which the water leaks. Rags, chewing-gum and wooden plugs or corks are sometimes used for temporary repairs. A permanent repair may be made by draining the water from the radiator and then filling the leaking spaces with waste and iron cement. The iron cement will soon harden and make a solid repair.

A Temporary Repair

A good temporary repair for cellular radiators may be made with a light, thin bolt, long enough to reach through the radiator, and having large metal and rubber washers at each end.

Soldering a radiator requires an expert, and a novice is apt to open up more seams than he repairs. It is generally necessary to remove the radiator from the truck and to place the radiator in a horizontal position, in order that the solder may not run off too quickly.

If a leak in the radiator cannot be found, plug up all the openings except one and connect it with a tire pump. Place the radiator under water and pump air into it, and the escaping bubbles will denote the leak. The spot can be marked with chalk, so that it may be easily found later.



Temporary Radiator Repair by Plugging Cellular, Tubular and Crimped Tubular



Motor Truck Design and Construction Made Plain Advantages and Disadvantages of Different Types Discussed

By C. T. SCHAEFER, Member Society Automobile Engineers

This is the tenth installment of a series of articles by this well-known writer, covering in a non-technical way the various constructions now current practice in commercial car design. These articles will take up, in order, the general types of chassis, the advantages and disadvantages of each, illustrated by simple diagrams, and in logical order, motor construction, ignition, carburetion, cooling, lubrication, etc., until each part of the truck has been dealt with.

IGNITION—INDUCTOR MAGNETOS

Foregoing articles explained the high tension and low tension types of magneto. They, with this article, complete the subject of commercial car ignition.—Ed.

PART X

THE magnetos described in the previous articles, generating either high or low tension current, were built on the principle of placing the winding or windings on the armature core, so as to rotate in unison with the armature.

The inductor type of magneto differs from the above, in that the windings are stationary within the magnetic field of the magneto and the armature is replaced by inductors which revolve, being attached to a shaft. In fact, these are the distinguishing features of this type of magneto. In other words, a stationary winding is used and mechanical energy is transformed into electrical energy through a distinctive principle known as induction.

This inductor type, like the primary and compound armature types, consists of permanent inverted U magnets and pole pieces which form the magnetic field, mounted upon a non-metallic base. The winding or windings may be arranged for either a high or low tension current and may either be placed in the magnetic field or at the rear end of the magneto.

The armature is replaced by inductors, mounted upon a shaft, this unit being termed the rotor shaft. The inductors are in some cases fan-shaped. The Remy inductor shaft, which is of this type, is illustrated herewith. It is made of laminated steel, claim being made for a better magnetic circuit with this construction. Each lamination is given an insulated coating on one side, the object of this being to eliminate eddy currents and to reduce heat losses.

The circuit breaker, or interrupter, is also used to open and close the primary circuit at the proper time, while the distributor is also resorted to to distribute the high tension current to the proper cylinders. In fact, this type of magneto incorporates all the principal parts mentioned in connection with the previous types, such as the condenser, safety spark gap and switch.

The functions performed by these units are identical with those described previously. As mentioned above, the principal difference of this instrument over the others, lies in the method of generating the current.

In the last installment the method of magnetizing a bar was described in connection with the induction coil, and we may now investigate the method of utilizing this magnetism to produce electrical currents.

In a coil, an electrical current will be said to be flowing in the coil, meaning that it passes in the wire. Magnetic flux, how-

ever, is unchanged. Electro-motive force tends to produce an electric current and if the circuit is closed it actually does produce a current.

The electro-motive force produced in a single turn of winding is proportional to the rate at which the magnetism through that turn varies. A winding of several turns may be regarded as several windings of one turn, connected in series, so that to obtain a high induced electro-motive force, a winding of several turns is used, just as several dry cells are connected in series to obtain a higher electro-motive force from that obtained from a single cell.

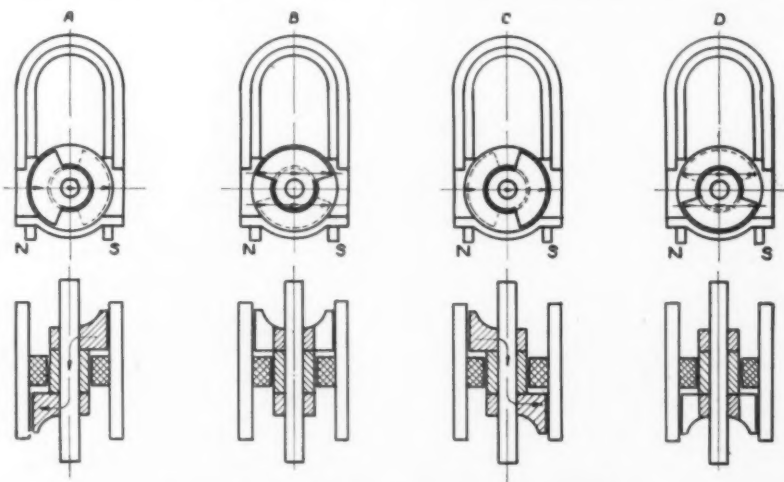


Fig. 1. Positions of Inductors and Their Shaft

ever, will be said to pass through the core in either direction, the core serving as a path to direct the magnetism through the coil. An electrical action is produced by the action of the magnetism in the core only when the strength of the magnetism varies, that is, when it increases or decreases. When this is the case an electro-motive force is induced in the winding and, the more rapid the variation of the magnetism, the greater the induced electro-motive force. Even if the core is traversed by a large amount of magnetism, it has no effect on the winding, as long as its value

In Fig. 1 are shown various positions of the inductors and their shaft. The upper view depicts the magneto with end plates removed, and the lower view represents a section on the line a-a of the upper view.

The stationary winding is securely held in place by the pressure of the pole pieces against it and by brass strips which have been omitted to simplify the illustration. The rear inductor, which is located to the rear of the winding, is indicated by dotted lines in the upper views. The inductors and core are secured to the shaft and ro-

tate with it, constituting the only moving parts shown.

In order to form a path for the magnetic flux it is merely necessary to have a mass of iron joining the pole pieces, this being provided by the inductors, core and their shaft. The arrows show the path of the magnetism through the revolving parts.

In the position A, the front inductor is adjacent to the pole piece N, the rear inductor is adjacent to the pole piece S, and the path is formed by the inductor shaft. When the cross-section of the inductor shaft is not great enough to carry all the flux, a core must be added to carry part

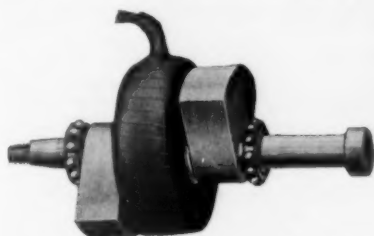


Fig. 2. Remy Inductor Shaft
With inductors, winding, ball bearings and interrupter cams

of it. The magnetism, therefore, in position A, passes from the pole piece N, to the front inductor, through the core and shaft to the rear inductor, thence to the pole piece S. The magnetism through the winding is from the front to the back.

At B, the inductors are so located that each forms a path between pole pieces N and S, and the magnetism passes between the pole pieces without any of it passing through the winding.

At C, the conditions are similar to those at A, but the front inductor is adjacent to the pole piece S and the rear one adjacent to the pole piece N, causing the magnetism to pass through the winding from back to front, which is opposite to the direction which it had in position A.

Position D is similar to B, except that the front inductor is downward and the rear inductor upward. In this position no magnetism passes through the winding. From the above it can be seen that the magnetism passing through the winding is continually varying, thereby inducing in the winding an electro-motive force.

As the inductors approach position A, the magnetism through the winding is increasing and as they have that position the magnetism begins to decrease, without changing its direction. The direction of the induced electro-motive force is reversed as the inductors pass through position A, and is again reversed when they pass through position C. As the inductors approach position B, the magnetism through the winding is from front to back and decreasing, but after they have passed this position, it is from back to front and increasing, resulting in no reversal of the electro-motive force. This is also true of position D.

Although the current from an inductor magneto may be utilized in the same manner as that from any other alternating current magneto, the above sets forth the conditions existing in the Remy Magneto,

various illustrations of which are presented herewith. This instrument generates a low tension current and requires an outside coil to step up the current to the high potential required at the spark plugs.

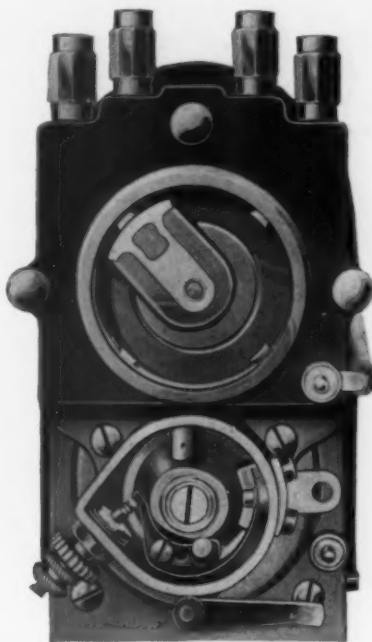


Fig. 3. End View of Remy Magneto
Showing distributor and interrupter

In the K.W. inductor type of magneto, there are four inductors as illustrated, made of soft iron laminations. Two of these inductors are placed 180 degrees to each other and the other two in a plane at right angles.

The windings, which are concentric with the inductor shaft are mounted between the inductors and stand absolutely still. The inductors collect the magnetism from one pole piece and conduct it through the center of the windings to the opposite pole piece. The primary winding is surrounded

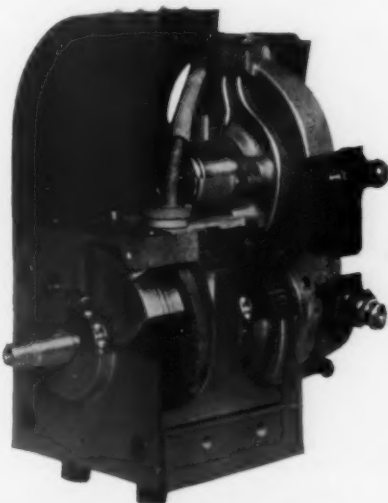


Fig. 4. Cut-Away Section of Remy Magneto

by the secondary winding. The primary current passes through the circuit breaker and at the moment of interruption a powerful surge of current is generated in the secondary winding, which is distributed to the spark plugs, thus producing a high tension current without the aid of external coils. This is one type of inductor magneto generating a high tension current. The Pittsfield magneto offers another example of a high tension inductor type magneto; however, it differs materially from the above. The usual primary and secondary windings are used, however they are not incorporated with the inductor shaft, but are located at the rear end of the magneto.

The three illustrations show a longitudinal section through the entire instrument, cross section through the magneto and pole pieces and end view of the interrupter.

The magnetic field contains four poles, two (4A) of which are the poles of the permanent magnet as illustrated, the other two poles (4) and the iron core (5) of the coil compose the field. The rotation of the inductor shaft (1) generates in the windings of the coil (6) an alternating current which attains a maximum four times during each revolution of the inductor shaft, which means, that for each 90 degrees rotation of the inductor shaft, ignition may be obtained. One end of the primary winding is connected to the field by a contact (8) and its other end is attached to a contact block (9) which is screwed on the field and insulated by a hard rubber bushing and plate. Connection from this plate to platinum contact block

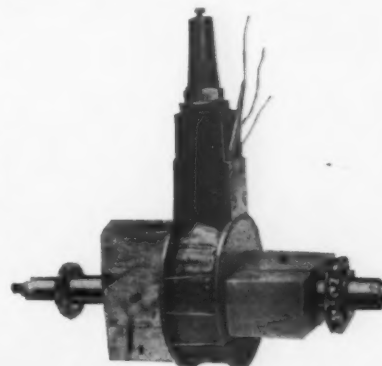


Fig. 5. K-W Inductor Shaft

(9) and screw is made by a brass contact strip. The latter is insulated from the interrupter plate (11), which is in metallic connection with the field or ground.

The platinum screw (13) on the interrupter lever (12) is held against the platinum screw (1) in the insulated block by means of a spring (14). The current generated in the primary winding is therefore short circuited as long as the two platinum screws are in contact.

The primary current is interrupted when the core (15) actuates the lever (12) separating the platinum points. A condenser (16) protected by a housing (17) is connected in parallel to the interruption of the platinum points. One end of the secondary winding is connected to one end of the primary winding and the other is led to a con-

ductor by means of a metal bridge (19). The secondary current is led from this bridge member to the distributor (23) by means of insulated conductors (18), which are connected by means of a carbon brush and spring. In the distributor plate (23) are socket inserts connected to distributing inserts which take the high tension current from the revolving conductor (21) in proper rotation and from socket inserts in the distributor plate (23) cables are connected to the spark plugs in the cylinders.

The safety spark gap consists of a short pointed brass rod set on the metal bridge (19) connecting the high tension terminal (26) on the coil (6) with the high tension conductor bar (18), and should there be

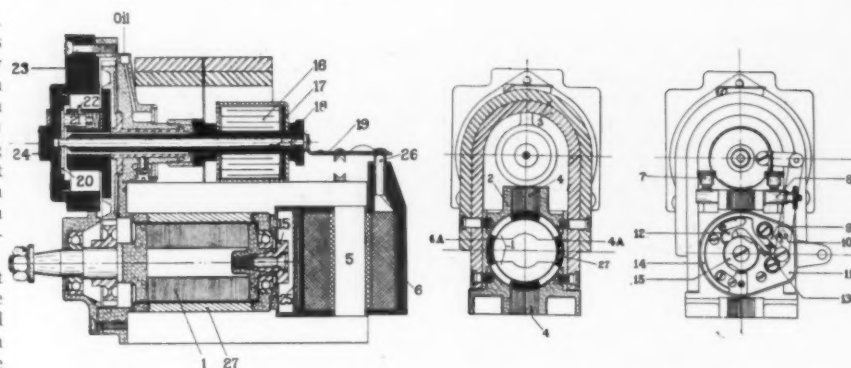


Fig. 7. Longitudinal Sectional, Cross Section and End View of Pittsfield Magneto

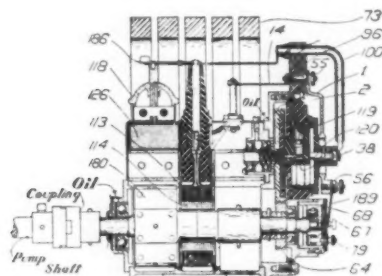


Fig. 6. K-W High-Tension Inductor Magneto

any interference with the circuit normally provided through the spark plugs, the safety gap provides a point of discharge.

The timing of the spark is generally accomplished by opening the interrupter earlier or later, and with the unavoidable result that if the position of the pole pieces in the magnetic field remains stationary, the relative position of inductor shaft and field at the moment of the break must vary. The quality of the spark, or, in other words, the heat value, depends among other factors upon the particular position of the inductors in relation to the field poles at the moment the spark is produced.

The changing of the timing is effected in the Pittsfield magneto in a unique way. The results obtained are ideal in that the same efficient spark is obtained, when the spark is either advanced, retarded or in any intermediate position. This is accomplished by changing the position of the field poles by means of a four-segment sleeve (No. 27), one for each pole of the machine, which sleeve is fitted with a lever with which the sleeve, with interrupter can be advanced or retarded, giving early or late ignition.

The inductor type of magneto is also made in the dual type; in fact, in the Remy, the same transformer coil, interrupter and distributor as is used for the magneto current. With the K.W. it is necessary to employ an external coil.

The Pittsfield dual system is somewhat different from the other types explained, and owing to the unique construction it is very simple. It does away with the high tension coil and wires from the magneto to the switch, the dual system being self-contained.

The design and constructional details of the dual machine differ from the independent type, as previously described, by insulating both ends of the primary circuit instead of one end. One end of the primary

winding is connected to the interrupter as in the independent type, the other to the lever of a specially constructed switch, so that when the switch lever is on the side marked "Magneto," this primary lead is grounded, allowing the magneto to run as a straight high tension machine. When the lever is thrown to the battery side of the switch the primary lead is then connected to the batteries, thus permitting the primary and secondary windings of the magneto to be used for either current.

MOTORIZED FIRE APPARATUS AT SALEM FIRE

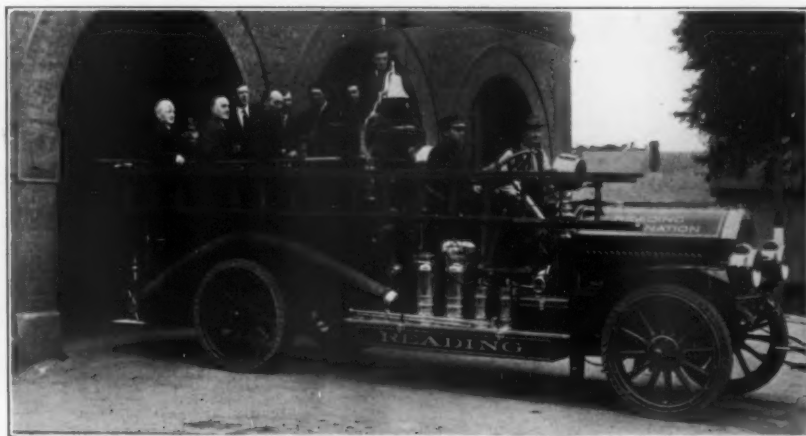
Working for ten hours and thirty minutes at full capacity without a skip or miss of the motor is the record made by a Knox rotary pumping engine at the Salem fire. Officials of the Knox Motors Company say this probably constitutes a record for this class of fire apparatus, for the reason that no engine has been called upon to work for a greater length of time continuously at an actual fire.

It will be remembered that as soon as it was seen that the Salem Department was unable to cope with the fire a call was sent to surrounding towns in Massachusetts. Instantly motor-driven apparatus was hurried over the roads from Reading, Lynn, Medford, Malden, Melrose, Winchester and

Cambridge, Reading being the only city that had a pumping engine. The Reading firemen realized the seriousness of the situation and the big engine was sent over the roads at top speed. At times it traveled at a rate of between 35 and 40 m.p.h. It reached the scene in approximately one-fourth the time that would have been required for a horse-drawn steamer to have been loaded on a railway car and shipped to the point of action.

Once at the scene of the conflagration the motor-driven engine was sent to the hottest part of the fire, where it worked side by side with the old-style steam pumps. Because of its self-contained driving power and consequently far greater mobility, the Knox engine was shifted from time to time to where the most water was needed.

It was due, to a great extent, to the quickness with which the fire apparatus and firemen from surrounding towns reached Salem, that the holocaust was finally stopped. Fire apparatus had the right of way on all roads running to Salem. Massachusetts, particularly the eastern part of the State, is probably more thoroughly modernized than any section of the country, in the way of motorized fire apparatus and the value of this was shown when the apparatus from other cities received the alarm. A dozen pieces of Knox apparatus alone responded from nearby when the first call for outside aid came in.



Knox Fire Engine That Helped Extinguish Salem Fire

This piece of apparatus ran from Reading, Mass., to Salem, when the local apparatus was unable to cope with the situation. It worked for ten and a half hours, at full capacity, without trouble.



Are Present Methods of Transport the Best?

By OUR FOREIGN CORRESPONDENT

ALTHOUGH conditions on your side of the water are very different in many ways, a review of certain phases of motor transport in Europe is instructive.

While the prevalent tendency in Europe then is to regard the commercial car movement on the whole with great satisfaction, many are inclined to think the time has come to be more critical, and to see whether good cannot be made better. Such a mental attitude is certain to search out the weak spots of any movement: consequently, while it is generally admitted that the transport of wholesale goods offers a reasonably profitable proposition, the motor delivery of retail goods is being subjected to a severe mental stocktaking. This criticism is one of method rather than of vehicles, and it must be admitted that there is some force behind it. Many users do not yet seem to have realized the essential differences in the requirements of horse and motor deliveries, and that the methods suitable for one may not suit the other.

Retail Delivery Work—Conditions and Requirements

Storekeepers who have to effect retail deliveries may be divided into two distinct classes as far as their wants are concerned—the first, the owner of the big city store, who has to deliver purchases not only in that city, but in an area of fifty miles around it; secondly, the smaller man, whose customers are practically confined to his own immediate district.

In the first case, of course, the requirements of delivery to customers to the district immediately surrounding the store are the same as for the smaller man, as also the conditions of working, except that in the big cities the traffic is generally denser than that which the local storekeeper has to cope with; and this in the old ill-planned towns of Europe means a very considerable speed difference.

Difficulties—Light Mileage and Stops

But both in long distances and local delivery work, though the working conditions may vary, the difficulties in both cases are the same—an ever-diminishing load and constant stopping, often for the delivery of goods quite out of proportion to the time lost to the driver and his vehicle, which often represents a considerable capital standing idle, and on the long distance work we not only frequently find a load

ever diminishing to nothing on the outward journey, but no load at all on the return.

The difference in the difficulties facing the two classes of traffic—long distance and local delivery retail work—are merely a matter of degree. In long distance work, while the disability of diminishing load is greater, in the latter class of work the local delivery van suffers more severely from the constant stops at houses.

Some Constructive Suggestions

It might well be suggested that instead of going out and returning empty by the same road, as is often done, a little more elasticity of arrangement be exercised in the working. I know the subject is a most difficult one. Customer A orders some provisions which he wants before 11 o'clock in the morning, while any time of the day will suit customer B in the same neighborhood. Still the wants of customers are as broad as they are long, and if customer A does want his stuff early, possibly customer C in quite a different neighborhood may want his earlier still. The fact is, one cannot please all parties, and he who tries to do more than his commercial best in this matter is a fool. After all, the more urgent deliveries might be effected by a special service of light vans or carriers, while the less urgent parcels

be taken by a car making a complete round delivering all the way, and not merely delivering along a road and coming back empty. Such an arrangement would at any rate reduce the light and unprofitable mileage, and even for much of the long distance work might be practicable if the load could be made up of a moderate number of reasonably large consignments rather than multitudinous small ones. For the local storekeeper, who usually works his vehicles on a "round," this trouble is less accentuated, but even so, quite a considerable distance by the end of the round is often run without load, and much more might be done in arranging rounds to better advantage, always remembering that it is not only bad from a commercial point of view to run without load, but it is mechanically bad, and the repair bill caused by light running more than counterbalances any slight advantage accruing to the gasoline bill.



Five-Tonner With Stake Body for Carrying Large Pipes of Wine

The crane is hand-operated, and for this work the Weston pulley tackle has considerable possibilities. Loading facilities, similar to this, are what is needed

Are Smaller Vans Advisable?

At present for the long distances delivery vans of 1 to 1½-ton capacity, running on solid rubber tires, are generally used, but whether this is the best possible type is open to question. Where the consignments are large and few probably it is, but when, as often happens, the load is a mixed one or made up of small consignments involving frequent stoppages, it is more than doubtful.

A 1 to 1½-ton van averages about \$14 working cost, inclusive of all capital charges. On the usual solid rubber tires its average practicable speed, exclusive of stops, is about 12 m.p.h. Its working cost would be \$1.68 an hour, or \$14 every five minutes. If it is a profitable investment presumably then its time is worth more than this. Yet these cars are very generally used for deliveries of goods, the profit from which cannot amount to as much as the cost of delivery.

Except in the case of the bulkiest goods, why then can not a lighter and more inexpensive type of vehicle be employed? The working cost of a good light motor carrier should not amount to more than \$.05 or \$.06 to the mile, and such a machine would be capable of dealing with all but the largest size parcels. Moreover, since a higher speed is commercially possible with it than with the solid tired bigger van, its range of action is greater, and from this point of view it would be more suitable for the long distance as well as the shorter distance deliveries. Already there are signs that the running cost possibilities of the light car movement are being realized, and that before long we shall see a good many of the 2000 to 3000-lb. vans replaced by a lighter type.

In this matter the development of the light car—not necessarily a cyclecar—may have considerable influence, but at present there is a distinct danger of a good idea being discredited owing to the tendency to adapt private car designs for the far heavier loads of small vans. There seems no reason, however, why a good light four-wheeler produced at a figure within the \$500-mark should not meet with very wide-reaching success.

Some Objections and Their Answer

It may be argued that even if such an arrangement does entail the use of cheaper vehicles, it entails more of them and more men; and even though they can travel faster than the solid tired van, pneumatics are not relatively as cheap as solids. But after all, it is not a question of how many vehicles and how many men, it is a question of how many consignments and the cost of delivering each consignment. If a firm has a given number of parcels to deliver within the day, it may easily be more profitable to employ two men, each working an eight hours' shift, and even two vehicles costing \$.06 a mile inclusive, than to employ one man and one van for 16 hours at \$.14 to the mile over the same ground.

Seventy-two Cents Paid for Twelve Cents Value—An Actual Example

As an example of the shortcomings of the present system of retail delivery sta-

tistics taken last summer on a road in England were quoted in a paper read before the Imperial Transport Conference in London. The road in question measured 500 yds., and contained twenty occupied private houses at the most part at its far end; indeed there were no houses on the first 100 yds. On the average eight large motor vans came down this road each day, but only one called at more than one house, and in general the consignments left were so trifling that the whole day's consignments would have only occupied a small corner of one van. Yet 4 van-miles were run at a cost of \$.72 where a ½ van-mile would have sufficed at, say \$.12 inclusive of stops.

Taking all factors into consideration it seems to me that everything points to the employment in retail delivery work of fewer 1 to 1½-tonners on solid tires, and more light vans and carriers capable of higher speed.

Co-operative Transport?

Another trouble which the local storekeeper has to face is due to the small number of cars he can employ, sometimes only one, generally two, three or four at the most. Obviously, automobile vans cannot be worked to the best advantage in such small numbers, and the need for organizations to do this work for local tradesmen in such a way as to always ensure them a spare car on emergency is being increasingly felt. It is true that the small storekeeper would not be able to reap all the profit from working in large numbers, but he at least could ensure better service, the chief objection against such an arrangement lying in the divided control of the driver. No man can serve two masters satisfactorily, but this difficulty might largely be overcome by the storekeeper himself being part proprietor of the transport organization; indeed everything at present in Europe also points towards co-operative transport. That a system somewhat on these lines can be worked has already been demonstrated with horsed traction in at least one town in Great Britain.

Some eight and a half years ago, just after the Heavy Motor Car Order had come into force in Great Britain and the utility motor was in its infancy, the writer suggested the possibility of such a scheme by which a system of quickly removable bodies (that could be changed as required by traveling cranes in the garage) or of removable name panels, might enable chasses to be kept more or less continuously at work, and such an undertaking need not confine itself to light vans.

Certain it is that methods that have suited horse traffic are not likely to be the best for the totally different set of conditions introduced by the automobile, and if delivery work at any rate is to be carried out to the best advantage I suggest that present methods will have to be very considerably modified. In my opinion, there is no reason why the smaller commercial car should not be more profitable, and quite possibly large undertakings on the lines already indicated might do much to better results by scientific methods.

SOME BRITISH WORKING RESULTS

A FIRM in Europe that has now employed motor trucks for a long time past, and very successfully, is Cannon & Gaze, Ltd. who have a large business as millers at Erith, Kent England. Some time ago they worked out the details of the service which one of their two five-ton Hallford trucks gave them, (which corresponds to the Saurer on your side). From these figures it appears that the Hallford ran a total mileage of 19,477 in 302 working days. Of the remaining days 52 were Sundays, 8 were holidays and for 3 days it was in the garage.

The following are the figures:—

Cost of truck	Per annum.	Cost per mile.
Interest at 5 per cent.	\$150.00	\$.0074
Depreciation	500.00	.0246
Insurance	75.00	.0036
Driver's wages	480.00	.0236
Gasoline	410.00	.0202
Lubricant	88.22	.004
Repairs	100.72	.0048
Tires	1003.00	.0494
	\$2800.94	.1376

Analysis of these figures leads one to the conclusion that though the truck was comparatively new and the repair figures were consequently abnormally low, depreciation was wisely put at a correspondingly high figure to balance the matter.

During the year a total tonnage of 2730 was carried, 2530 tons of which represents loads on outward journeys, 200 on the inward journeys. The average distance per working day amounted to 64.74 miles, and consequently the average load per day works out to approximately 9 tons per mile to 2.6 tons (of 2240 lbs.).

Obviously under such conditions the truck was working at little more than half its full advantage; yet even so, these particulars will show that it performed 167.7-ton miles daily at a cost of just 5 cents to the ton-mile—a fine illustration of what can be done by an automobile truck even when handicapped by circumstances.

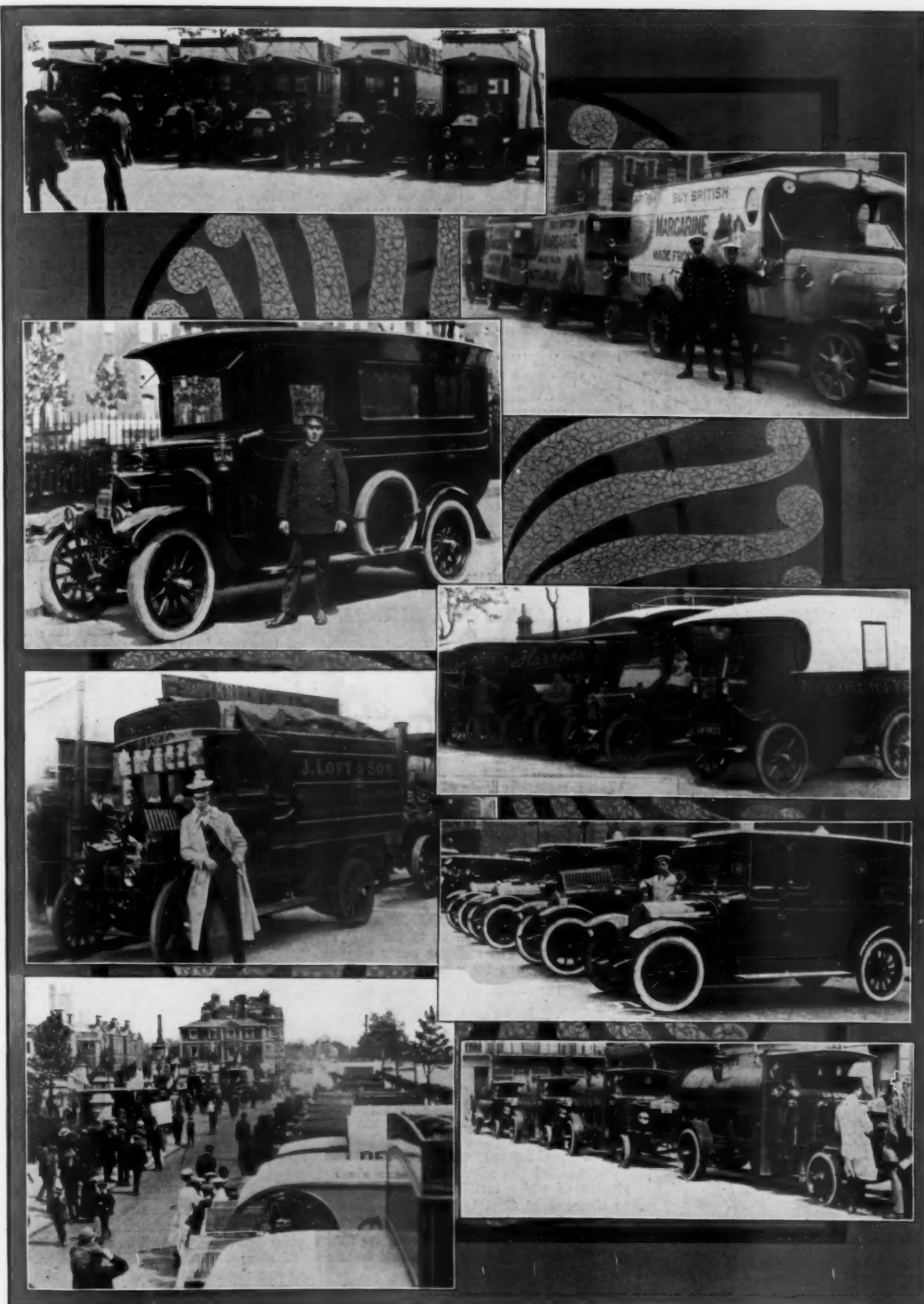
Wherever one goes in Great Britain you see "Johnnie Walker" whisky advertised, and the firm responsible for it, Walker Ltd., are very much alive to the possibilities of other things besides advertising. In 1912 they acquired a three-ton Commer car truck, and from August in that year to January, 1914 the running of this machine totaled 16,700 miles on a consumption of 1135 gals. of gasoline, and 146 gals. of oil.

The only repairs necessary during the whole period consisted of taking up the big ends after 13,000 miles at a cost of \$6.25 and providing a new ball race for one of the back wheels and two links for one of the side driving chains at a cost of \$5.

Taking gasoline at the mean price of 35 cents a gallon, lubricating oil at 12 cents, we get the following figures:—

	Cents per mile.
Interest on outlay (assuming a 7 year life).	.42
Depreciation	2.46
Insurance	.42
Driver's wages	3.70
Repairs	.06
Tires	2.30
Gasoline	3.38
Lubricant	.22

12.96



Views of the Recent London Commerical Car Parade

A COMMERCIAL CAR PARADE

Every year, when all England is making holiday on Whit-Monday, the Commercial Motor Users' Association holds its annual parade in London, and this year marked a record with its five hundred and nine entries, which easily beat the figures of the Coronation year, which were just over four hundred. Of the trucks entered, three hundred and eighty-four were gasoline, one hundred and twelve steam, while electrics only numbered thirteen, for as yet the electric has not caught on in Great Britain, possibly partly from economic reasons, but partly because it has not hitherto been pushed. Its possibilities, however, are beginning to be realized, as is reflected in the comparative figures, for only five made their appearance at the parade in 1913.

The marshalling of over five hundred vehicles is no light matter, but on the whole the arrangements were distinctly good, though here and there mistakes were made, the narrowest parts of the streets in some cases being allotted to the largest class of trucks, which made manœuvring a little difficult. Still, everything passed off well, and after the prize giving, the drivers and their friends were given a variety entertainment, including a cinematograph show of the parade of a few hours previous—smart work.

As a result of the fillip given to the type by the recent French trials the four-wheeled drive truck is very much to the fore in Europe, and now Russia is following the lead of France, for the Russian Government is organizing a trial of four-wheeled drive trucks to begin on the 15th of September next.

SOME RESPONSIBLE COMPARATIVE ESTIMATES

Working Figures of Electric, Steam and Gasoline Truck

The Heston and Isleworth Urban District Council have been considering the purchase of an automobile for house refuse collection, and have consequently been going into the matter of working costs. As a result an official report issued by that Council, giving the comparative figures of working of three types of motor vehicles, is decidedly instructive, more especially in that it takes cognizance of the expense involved by the motor being laid off work for a certain period (as indeed it should be) every year.

Electric Motor Vehicle

Vehicle complete with house refuse van body	\$4200
Repayment of principal and interest per annum	693.70
Driver's wages at \$7.50 per week	390
Tires (estimated life, two years)	150
Electrical energy	115
Repairs, electrolyte, etc.	100
Insurance	100
	<hr/> 1548.70
Add for one day per month, overhaul, during which time hired horses and carts would be employed	116.95
Cost per annum for seven years	1665.85
Estimated saving over horse traction per annum (Council's horses)	358.17
Estimated saving over horse traction per annum (hired team basis at \$2.47 per day)	726.90

Garrett Superheated Steam Wagon

Vehicle complete with house refuse van body	\$3085
Repayment of principal and interest per annum	510
Driver's wages at \$8.72 per week (commence at 5 A. M.)	455
Tires (estimated life, two years)	150
Fuel (allowing 6 cwt. per week at 36 cents cwt.)	117
Repairs	100
Oils	25
Insurance	100
	<hr/> 1457
Add for two days per month, overhaul, during which time hired horses and carts would be employed	233.90
Cost per annum for seven years	1690.90
Estimated saving over horse traction per annum (Council's horses)	333.41
Estimated saving over horse traction per annum (hired team basis at \$2.47 per day)	701.22

Thornycroft Petrol Wagon

Vehicle complete with house refuse van body	\$4075
Repayment of principal and interest per annum	673.16
Driver's wages at \$8.72	455
Tires (estimated life, two years)	150
Petrol (24 gallons per week at 29 cents gallon)	376.95
Repairs	125
Oils	25
Insurance	100
	<hr/> 1905.11
Add for one day per month, overhaul, during which time hired horses and carts would be employed	116.95
Cost per annum for seven years	2022.86
Estimated saving over horse traction per annum (Council's horses)	\$185
Estimated saving over horse traction per annum (hired team basis at \$2.47 per day)	370

AN AMERICAN TRUCK TRIAL IN EUROPE

There are signs of the American commercial car manufacturer seriously invading the European market. One of these fore-runners of future developments was to be seen in the 25-30 h.p. Whiting Federal three-ton commercial car which recently underwent an official test at the hands of the Royal Automobile Club of Great Britain. With a passenger body giving the machine a running weight of 7532 lbs., the car was driven from London to Glasgow a distance of 402¾ miles which was covered without an involuntary stop at an average speed of 12 m.p.h. Under these conditions the consumption worked out at 10.63 miles to the gallon, or 35.72 ton-miles to the gallon, or 12.73 net ton-miles. Oil consumption worked out at 330½ miles to the gallon; the consumption of radiator water for the total distance was 1.9 gals.

RECENT BRITISH WAR OFFICE TRIALS

A communiqué just sent out by the Mechanical Transport Department of the War Office gives a few particulars of their trial of subsidy type lorries during April and May. On the whole, the event has been very successful. Five different makers submitted three-ton cars for test, and all completed the whole trial, at the conclusion of which certificates were granted to Commercial Cars Ltd., Leyland Motors Ltd., and Dennis Bros. Ltd.—the latter subject to tests of the improved type of engine being carried out to the satisfaction of the War Department.

Two paraffin carburettors were also tested, and, although particulars of these

are not to hand, it was found that on gasoline over an exceptionally stiff and hilly course the average result of all the entrants gave a consumption of 1 gallon to 54 gross ton-miles, while the best result over a short distance of about 200 miles was 63 gross ton-miles to the gallon.

Previous best results have been 59 and 68 gross ton-miles respectively. As there were a few really hot days during the trial, some opportunity was afforded of testing the radiators, which proved to be of ample capacity. One point has cropped up as a result of these tests. It appears that it will be necessary in future to specify the maximum depth of the lower channel of the radiator, so as to make sure that it does not foul the frame in some cases. For this reason the radiators at present are not as interchangeable as they should be.

During brake tests on very steep hills it was found, on the whole, that a brake on the propeller shaft is more effective than on the back wheels.

On the whole, there appears to be a tendency towards a uniformly, rather larger type of engine. The sizes in the last trial varied from 348 cu. in. to 394 c.c. as against the previous smallest of 318 c.c., and the previous largest of 472 c.c.

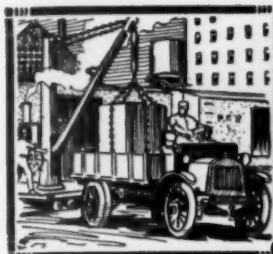
THE FRENCH MILITARY ENDURANCE TRIAL

The French endurance trial for heavy vehicles, which is taking place the whole of this month and extending into August, is purely a test of cars for military work to decide which machines shall be eligible for subvention under the French Army regulations.

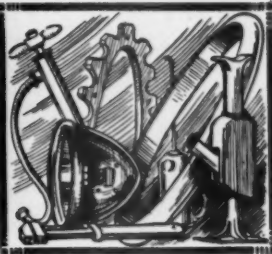
This year the trial includes both wagons and tractors, and to the latter additional interest is given by the four-wheel drive tests that the French army authorities have already carried out during the spring, for two examples of the successful Renault machine are entered, Panhard have four tractors in, Balachovsky et Caire (who were unable to have their machine ready in time for the four-wheel drive trials) have entered four tractors of different sorts, while Delahaye have also brought out a tractor.

As is usual now, each day's journey starts from Versailles, and six different routes radiating from that point afford variety of itinerary each day of the week. For the wagons the daily distances range from 88.9 to 95.1 miles, while the daily distances for the tractors vary from 56 miles to 67 miles.

The trial is also instructive, because all the machines entered from the 6th to the 16th of this month are running on gasoline, from the 17th to the 26th they will run on carburetted alcohol, while from the 27th to the end of the trial, on the 4th of August, they are to use benzol. During this trial, tests will be made of the capabilities of the machines to tow each other, to go in reverse and haulage by capstan, while separate tests will be made of brakes and sprags. From the 5th to the 8th of August the responsible officials will be examining in detail the various parts of the competing machines.



TRUCK ACCESSORIES AND APPLIANCES



ROSS BRINGS OUT NEW FORE AND AFT STEERING GEAR

The Ross Gear and Tool Company, of Lafayette, Ind., is calling attention to its new fore and aft steering gear for truck use, and which is built in four sizes, having practically the same general constructions.

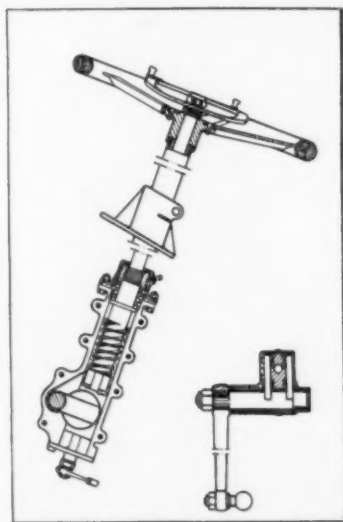
At the lower end of the tube upon which the steering wheel is mounted, a steel screw is supported between two ball bearings to take up its end thrust. This screw is held

the screw is turned by the steering wheel; the sleeve is thereby moved transversely in the housing, carrying the cylinders with it; as the cylinders move transversely, they rotate and force the rocker shaft into rotation, thereby moving the steering arm. The steering gears are semi-irreversible in their action due to the reduction in the screw.

The material used in the construction of these fore and aft steering gears is of the highest grade throughout. The ball races are made from 110 carbon high chrome nickel tool steel treated in oil, and carefully ground. The screw is manufactured from open-hearth machinery steel, and is case carbonized and ground in a special screw grinding machine. The sleeve is made from a special grade of open-hearth machinery steel and is case carbonized and ground on its exterior. The cylinders are made from a special alloy of antifriction metal. The transverse shaft is made from 40 carbon chrome nickel steel, is oil treated and ground all over. The steering arms are drop forgings, and the balls on the ends of the steering arms of the three largest sizes are made separate from the arms and of low-carbon, chrome-nickel steel, case carbonized and polished. The fact that all of these parts are hardened and ground, tends to greatly increase the life of the steering gear and adapts it especially for hard truck service.

The spark and throttle control may be placed either on top or below the wheel.

The oiling device on the gears equipped with external spark and throttle control, is a plug provided in the top of the nut on the steering wheel. This plug is held in place by a spring. In order to lubricate the gear, the plug is lifted and oil is poured into the tube. A fairly heavy machine oil should be used. No other lubrication is necessary on this type gear. On the steering gears where the spark and throttle control is internal and operated on a sector on top of the wheel, a grease cup is provided on the housing of the steering gear, and should be filled frequently. The steering wheels are furnished in sizes and materials suited to their purpose.



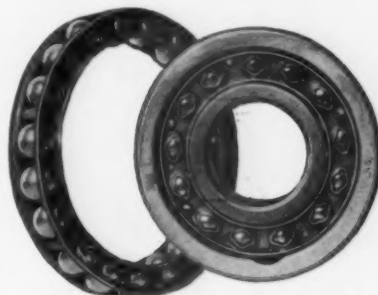
New Ross Gear for Trucks

to the tube by means of a brazed joint. When the screw is turned, a steel block or sleeve is given lateral movement. This steel block or sleeve has a square external section, and is thereby prevented from turning. On each side of the lower end of the steel sleeve, cylindrical recesses are turned, and cylinders, which are free to rotate, are placed in these recesses. These cylinders have slots milled in them, which receive the projecting arms from the rocker shaft. The action of the gear, therefore, is that

RIEBE BALL BEARINGS

The races of these bearings are solid hammered chrome steel, with a very close tolerance. The balls are held by a light cage upon the point nearest the axis, reducing resistance and increasing efficiency.

The balls are inserted by springing slightly the outer race by means of a half circle wedge operation in the cold state, so



Riebe Ball Bearing and Retainer
With Balls

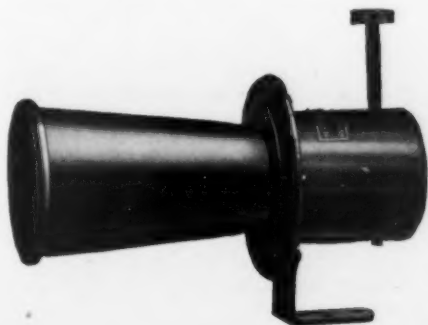
that the ball drops into the bearing of its own weight, and is not forced in by a tool. This does away with the possibility of jamming the ball by scratching it and have the raceway become damaged by the scratched ball. The race, upon being released, returns to its original dimension. By reason of this method of filling the bearing with balls, the inner race is not notched and has a deep raceway and therefore full strength of the material around the entire circumference. These bearings are handled by Olin and Lowy, 1790 Broadway, New York City.

ECONOMY SPEEDER AND PRIMER

The Automatic Device Company, 551 East Jefferson Street, Frankford, Ind., makes the Economy Speeder and Primer. A small reservoir is located on the dash with a valve to control the supply which goes to the inlet manifold. The price of the device is \$5.

The Handphone and Cablephone Horns, \$7 Each

Produce a sound sufficiently loud and penetrating to be heard above the noise of the street. The first can be attached to either side of the car and is operated by slight pressure of hand or elbow. The mechanism of the second is identical with the first except in being operated by a cable or chain. One end of the chain is fastened to a grooved member inside the case and the other to the steering wheel or other position convenient to driver. It is especially adapted to trucks. The horns are produced by the Automobile Supply Manufacturing Company, 220-24 Taaffe Place, Brooklyn, N. Y.



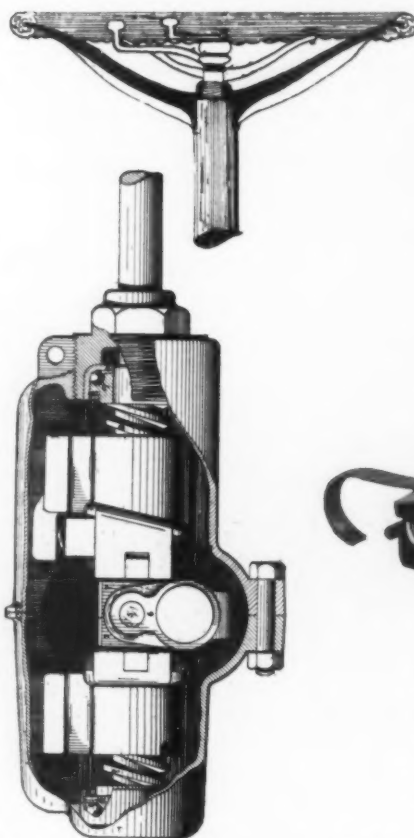
NEW MAYO GARAGE PUMP

In view of the fact that many light commercial cars and delivery trucks are shod with pneumatic tires, the need of a quick-acting pumping outfit in a garage harboring many commercial cars is apparent. One of the latest garage pumps to make its appearance is the Mayo Electric Garage Pump, built by the Mayo Manufacturing Company, 54-60 East Eighteenth Street, Chicago, and which is designed especially for heavy service.

To guard against burning out the electric motor by starting against too heavy a resistance, the air is first pumped into an auxiliary tank underneath the pump, from which the air goes through the rubber tubing to the tire valve. The tank is fitted with a pet cock, which is automatically opened when the starting switch is turned off, thereby exhausting the air pressure in the tank. When the switch is turned on it automatically closes this pet cock so that the motor is always started up against the empty tank, which permits it to speed up before working against a heavy tire pressure. The pump cylinders are 1½-in. bore by 2-in. stroke. The lubricating system is unique. At each end of the pump is an oil well in which runs an oil ring that carries oil to the main bearing. From each main bearing a hole is drilled through the crankshaft to the connecting rod bearing. This is filled with a wick which carries oil to this bearing, and through another wick in the center of the connecting rod the wrist pin is oiled. All surplus oil carried by the oil rings is returned to the oil wells and used over again. Thus one filling of the oil wells will lubricate this pump for months.

THE MASCO "NON-SLACK" STEERING GEAR

This gear is produced by the Masco Manufacturing Company, 1119 Chamber of Commerce, Detroit, Mich., and is worm and nut type, with a worm of the best C. R. steel tubing, reamed ⅝ in., 1½ threads to inch, lead of .667 in., diameter 1.25 in.,



Cutaway Casing of Masco "Non-Slack" Steering Gear

shaft 1.0317 in. and thickness of thread 3-16 in.

There are two phosphor-bronze nuts, one on either side of the trunnion block, on rocker shaft ball arms. These nuts slide in keyways broached in the top and bottom of housing. On the face of each of these bronze nuts is a drop-forged shoe of low-carbon, chrome-nickel steel, carbonized and hardened, both sides of these shoes being ground to a smooth glass face or surface. The face of upper nut is machined with a taper of 13 degrees (below neutral) to accommodate and seat the hardened and ground steel wedge which is of the same degree of taper. To take up all wear, the wedge is advanced by a coil spring, as shown in illustration. The shoes mentioned are interchangeable.

The rocker shaft is drop forged of low-carbon chrome-nickel steel. In each of the upper ball arms of rocker shaft is compressed a trunnion pin of crucible steel, hardened and ground. On each of these

The Mayo Electric Garage Pump

Consisting of a ¼ h.p. electric motor, driving through silent chain a two-cylinder Mayo pump. The pump is water-jacketed, the water tank being located over the top of the electric motor. The price of the outfit is \$75, which includes 12 ft. of rubber tubing, 10 ft. of electric wire, and holders for both electric wire and hose.



Mueller Clamp Lamp, \$3

pins is a trunnion block as mentioned above, made of C. R. steel ⅝ in. thick, no sharp corners or edges, ground perfectly. These blocks operate between the two nuts on worm and make positive action of the gear. Ball bearing bushings are used.

THE MUELLER CLAMP LAMP

The lamp consists of a socket with combined reflector and guard, mounted on a clamp of special design, the clamp acting as a sort of third hand to hold the light where one wants it. The jaws of the clamp have a spread of 2½ in. and may readily and quickly be applied to a bench, pipe, rod, spoke, fender, wire or rope. The hook on the end is for use where nothing is available to apply the jaws.

The lamp has all the features of the ordinary hand lamp, in addition to the clamping feature. When used as a hand lamp the clamp serves conveniently as a handle. The reflector is nickel-plated steel and, with the wire-front cage, serves to protect the lamp from breakage. The socket is so mounted that it is insulated from the clamp proper and contains a switch operated by a short hard-fiber knob. The socket turns so that the reflector may be rotated to throw the light on the work and shade the eyes.

The cord is of the portable, rubber-reinforced type, waterproofed. The plug is of the two-piece separable type. The pull need not be straight out, but may come from any angle, so that if the cord is tripped over, the plug separates and no harm is done. The use of a 15-watt tungsten lamp is recommended.

The complete outfit consists of a clamp, socket, reflector with wire guard, 20 ft. of cord, and plug—all wired and shipped in an individual carton. Price, \$3 net. Extra cord \$.05 per foot. It is manufactured by R. S. Mueller, 423-425 High Avenue, Cleveland, Ohio.

VLCHEK'S VALVE LIFTER

Vlcek Tool Company, Cleveland, Ohio, has added a new drop forged valve lifter to its line of tools. The sharp points of the tools are easily inserted between the

**Vlcek's Drop-Forged Valve Lifter**

springs, the machine-cut thread and the sliding movement of cam, which spreads the jaws, makes for easy operation. A bar can be passed through the handle for greater leverage where desired or necessary.

SPEDOLENE—NEW LUBRICANT CONTAINING ASBESTOS

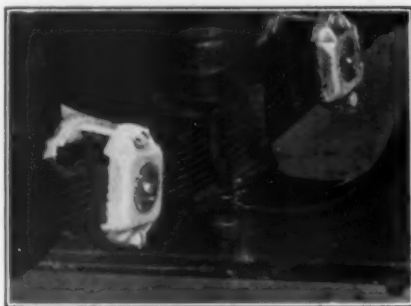
The Continental Asbestos Company, 7-11 Summer Street, Worcester, Mass., is offering a new line of lubricants for general purposes, all having as a base semi-fluid asbestos. One of these, Spedolene, is intended especially for the lubrication and maintenance of transmissions, differentials, universal joints, timing gears and worn gears in trucks. It sticks to the gear teeth, forming a permanent film or cushion which eliminates gear noises and metallic sounds and is not affected by temperatures. Another important quality of Spedolene is

that it does not run out or throw out at the bearings or axle drums. It is both adhesive and cohesive and will not gum up.

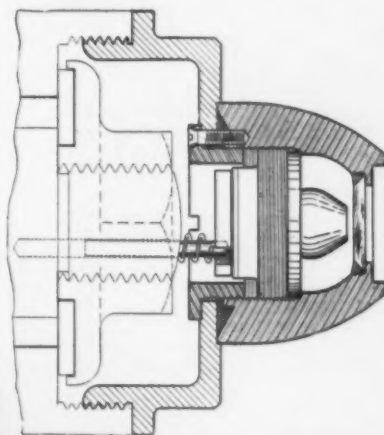
It is furnished in two grades: S for use on new gears, and SS for worn gears. It is put up in quantities of 5 lbs. at \$1.25; 10 lbs., \$2; 25 lbs., \$4.75, and 50 lbs., \$9. These are in cans; barrels and half barrels are also furnished.

THE BROWN OIL BOX

The object of this device is to automatically lubricate springs and feed oil continuously between the leaves by capillary attraction. The oil cuts the rust, and the action of the springs causes the rust to work its way out, cleaning and polishing the intermediate surfaces of the leaves. In this way all the springs of the car are kept resilient, and the truck is made to

**Brown Oil Boxes in Place**

ride smoothly. This oiler is manufactured by the Brown Traflog Company, Rose Building, Cleveland, Ohio.

**Sectional View of the Transimeter Hub Odometer**

This mileage recorder was described in our December, 1913, issue, page 28. It is now being marketed by the American Taximeter Company, 735-37 Seventh Avenue, New York City, which has recently purchased the manufacturing right from the Taximeter Company. The feature of this instrument lies in the fact that its face does not rotate, it being held in the same position by a pin fitting in a hole in the axle, said pin being pressed outward by a spring. The housing is of extra heavy construction, which recommends this device especially for truck service.

Service, From the Standpoint of the Commercial Delivery Man and User of Motor Trucks

By WAYNE W. LIGHT

MUCH is said about service being rendered and service given by the automobile manufacturers, agents and salesmen, in their enthusiastic efforts to sell.

Seemed Simple at First

The difficult problems of the delivery man seemed to find a ready solution in the motor propelled vehicle and as soon as the wonderful field for business was seen, manufacturers, agents and salesmen alike plunged with all their might in an effort to revolutionize the local merchandise transportation and distribution of the world. It was immediately assumed that it was only necessary to build any vehicle along good mechanical lines and tell the merchant that it would operate so many miles and extend his territory 10 to 50 miles beyond his already established limits and carry so much more merchandise. It was assumed there was no question about the application of the truck to his business. The merchant and prospective user was told that the company back of the truck which it was proposed to install in his service maintained a service department and that delivery service was guaranteed him with the purchase of every truck.

It is apparent to everyone at the present time that many mistakes have been made in the development of the field for commercial trucks.

Future Assured

There cannot be any question about the permanency of the motor-driven vehicle for the local delivery and transportation of merchandise. Just as surely as the world continues to go around the sun, so are the times and conditions of living and merchandise changing. Population is increasing, rapid transit, telephones and the advertising are extending the territorial limits of the merchants' field. Quicker delivery is demanded notwithstanding the fact that the territorial limits are expanding. The suburbanite to-day instead of carrying his purchase home with him in the evening is afforded the facilities of the best express trains from the heart of the city to his very home, enabling him to get there in a few minutes to a half hour. He gets there quickly and wants his purchases there just as quickly.

It is impossible for the horse to render efficient service and prompt delivery over such extended territory and to keep pace with the irrepressible advance of the time.

Then, where is the trouble? Why should the merchant not be anxious to develop his delivery department into a properly and scientifically motor-equipped delivery and enjoy more promptly the fruits of such facilities of rapid transit.

One of the best ways to answer this question is to analyze the methods employed in effecting the sale of commercial trucks. Such analysis will conclusively show that one of the largest of the rocks which stand out as a menace to the successful cultivation and development of this field by the motor truck salesman and the merchant, is misunderstanding of the term service.

Service has become one of the biggest arguments in the selling and application of motor trucks to business and it also has become the largest factor in falsely boosting the hopes and ambitions of the merchant.

Service as Understood by Merchant

Service as understood by the manufacturer and salesmen and service as understood by the merchant are so entirely different that there is nothing short of a complete discard of the word that will insure against any repetition of its being misunderstood. A merchant or truck user

thinks in commercial language; mechanical language is as much out of his sphere as is botanical and astronomical language.

Store service, sales service, cash service, credit service and delivery service are some of the many service requirements and obligations that have been put on the merchants' shoulders. So exacting have been the demands of customers and business that these various elements of service have broadened to the utmost. Delivery service which is guaranteed with the sale of the truck or which is promised by the service station, in a definite or indefinite way assures the mind of the merchant that his packages are going to leave his store and be taken direct to his customer and delivered within the time allotted. Service to him precludes the possibility of motor troubles, punctures, stripping of gears, broken valves and ignition troubles, notwithstanding the fact that he is told that in the event of such troubles on the road, the service station will immediately rush a repair car to his disabled one and continue on with the load or put his own car in commission, so that it can deliver the load.

The only thing the merchant visualizes and understands in this direction is the prompt and efficient delivery of his packages according to the schedule which he has established. He must meet to the letter the customer's demands in the delivery of his merchandise, even if immediate delivery is requested and immediate collection made of material to be repaired or exchanged for redelivery the same day or half day. This is the service he must render to his customer. This is the service which he is so particular to enforce in every other department of his business that it is indelibly a part of his mind and is the only possible meaning of service to him. The truck salesman and manufacturer mean that they will give repair and care service to the merchant's equipment. They may mean and often do that they will assist in the delivery of goods to the merchant's customers by loaning or renting him delivery equipment whenever this service may be necessary. Even this is very often misconstrued as is evidenced by the many unpleasant experiences on the part of the agent in collecting service bills from the merchants.

Dealer Does His Part

The dealer keeps his part of the agreement and his representation in good faith, insofar as it is possible for him to do so. He sends a repair truck to the merchant's disabled one as soon as there is one available in his service station. The fact that the service repair car is out at the time of the call is no valid excuse to the merchant for the non-delivery or delayed delivery of his packages. Granting, however, that a repair truck is immediately available, time is required by the operator in reporting the trouble to the service station; more time is consumed in sending out the repair car to the disabled truck and still more in the transfer of packages or in the repair of the car before it is again sent on its way with its load. While this service rendered is most valuable to the merchant and probably in many cases is more extensive than it should be, yet the merchant's schedule is disarranged and complaints are received from his customers on account of delayed delivery for which the only excuse he has is that his truck broke down. He dare not say that it was due to inattention to the customer by any of the other departments of his store, but must blame it on the truck. He sours himself and his customer as well against the truck, whereas the same truck may be saving him money and may be a valuable element of his business. Much of this is simply because he has built an air castle around the term service, due to a great extent to the teachings of the automobile salesman who concentrated on the word service, but with an entirely different meaning. The complete elimination of this misunderstanding is one of the most important elements in establishing the delivery business on a motor vehicle basis. It also means to a very great extent the re-establishing of the truck salesman in the merchant's confidence and will also relieve him as well as the manufacturer from what is probably the heaviest and most expensive burden he has to carry and which first in his enthusiastic belief in the motor truck for business and later in his frantic efforts to sell the product of his factory he has voluntarily assumed.

Take the Merchant's Viewpoint

If the word service were understood by salesmen and merchant alike there would be no necessity for the salesmen and manu-

facturers to endeavor to live up to an impossible ideal and thereby build up such a structure of service as will eat up all his profits and require so much of his attention that it is impossible for him to develop his sales methods and his truck along lines which a closer study of commercial conditions and interpretations as there were deal-ditions would indicate. It is by far a simpler method for the manufacturer and the salesman to educate themselves to the merchant's point of view, than it is to educate the merchants or truck users who are legion.

"Service Station" implies a lot, the amount of time, energy and persuasion, that must be used in an attempt to clarify the merchant's understanding of the term service, so as to guard against a possible misunderstanding, could be used to sell many more cars. Salesmen must change their tactics to meet the practical conditions in their field. The merchant or truck buyer is a practical man and should be talked to straight from the shoulder, especially where care of his motor delivery equipment whether on the road or in the garage is concerned. The merchant should be told in just so many words, rather than informed by colored statements which inevitably lead him to expect something different from what he will get. This results in his keen disappointment and possible prejudice. This results many times in placing an unjust burden on the salesman, which he is bound to assume in the interest of future business and the merchant's good will.

Eliminate Misunderstandings

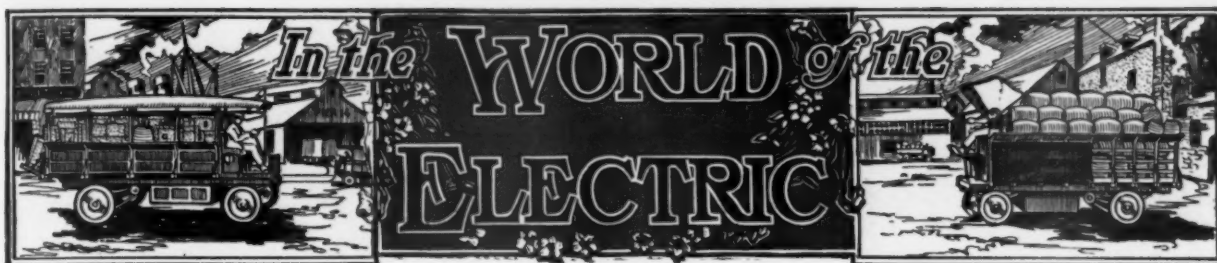
"Results," of course, are the most important elements to be discussed when selling motor trucks. But the cultivation of the proper attitude on the part of truck users and business people is an indispensable and invaluable assistance to the business of merchandising trucks.

Why not substitute "care station" for service station in the interest of merchants and truck salesmen alike, but above all in the interest of the development of this field, which is larger than that of any other business in the world to-day; substitute the word care for service, unless the meaning of the word service as practised is the meaning of the word from the Merchants' point of view.



Baker's Battery Fitted With Overman Tires

These eight Lippard-Stewarts are used by the Wagner Pastry Company, Newark, N. J. Last winter the company equipped two of its trucks with Overman tires, which gave such satisfaction that the other trucks were also fitted with these tires



Activities of the Electric Vehicle Association of America

PROBABLY the most noteworthy recent development was the formation of the Pittsburgh Section, made possible through the generous support and valuable initiative of Charles A. Ward, of the Ward Motor Vehicle Company, who, with the Executive Secretary, traveled to Pittsburgh, where a great deal of interest was aroused and the hearty co-operation of the Pittsburgh Electrical League and its members was obtained.

At a meeting of the Pittsburgh Electrical League, held on June 11, the Pittsburgh Section was organized and the Executive Secretary returned to New York that evening with twenty-two new applications for membership, and a petition for a Pittsburgh Section. Inasmuch as there were already five local members, the Pittsburgh Section started off with a total of twenty-seven members. W. A. Donkin, Duquesne Light Company, Pittsburgh, was elected chairman; T. H. Schoepf, Westinghouse Electric and Manufacturing Company, vice chairman; and J. A. Jaques, Western Electric Company, secretary.

The petition for the Pittsburgh Section was accepted and those instrumental in its organization were thanked.

No formal reports have been received from the New England, Cincinnati, or San Francisco Sections.

The regular meeting of the Executive Committee of the Chicago Section was held June 10. Louis E. Burr, scheduled to speak on the "Past, Present and Future Sales Methods of the Electric Pleasure Vehicle" was unable to attend.

Philadelphia Section held its regular monthly meeting June 10th, being addressed by Lieutenant Mills, of the Philadelphia Police Department on "Traffic Regulation." R. L. Lloyd, chairman of the section reported very satisfactory progress.

A special meeting of the Executive Committee of the Washington Section was held on May 21, and devoted to arrangements for a Sociability Run held on May 27, this run being the first Electric Vehicle run of its kind. Fifty-four electric cars were entered. The run started in front of the main entrance of the Smithsonian Institute and the course was laid out through the Speedway and Rock Creek Park, the finish being made at the Joaquin Miller Cabin, where a basket luncheon was served. The run was a sealed time affair, each contestant endeavoring to cover the fourteen-mile course, observing all traffic and speed

regulations, within a set time selected by a prominent government official. Handsome prizes were distributed to the winners.

The Los Angeles Section has gotten under way and elected J. Harry Pieper, of the Southern California Edison Company, Los Angeles, chairman; Harry W. Harrison, General Vehicle Company, Los Angeles, vice-chairman; and James F. Rogan, Edison Storage Battery Supply Company, Los Angeles, secretary.

Committee

The Executive Secretary reported progress in the matter of membership and Joseph F. Becker, chairman of the Membership Committee reported a total of forty-two applications for membership, received since the previous report to the Board of Directors. These applications are divided into the several classes of membership and make the total number of members at this time 763. The standing of the membership in the sections is augmented by the formation of the Pittsburgh Section since the last report.

Copies of the printed list of Directors, Officers, Committees and Members for the year 1913-14, have been forwarded to the members, with a letter, urgently asking each member to secure at least one new member to "Double the Membership." The office of the chairman is in correspondence with the members of the committee and members of the association in the different parts of the country, with the idea of arousing action and enthusiasm toward making a final spurt in reaching the goal.

This table shows the membership on June 19, 1914.

	Active		Associate	Auxiliary	Prom	Total
	C.	Mfr.				
May Report	93	35	560	10	28	726
Resignations ...	1	3	3	..	..	7
Total	92	32	557	10	28	719
Transfer .....	..	..	1	..	1	2
Total	92	32	558	10	29	721
Applications ...	4	..	38	..	..	42
Pending	96	32	596	10	29	763
Total Members	128	596	10	29	763	

Chicago Section					
May Report	12	96	1	6	115
Resignations ...	..	..	..	..	..
Total	12	96	1	6	115
Transfer .....	..	1	..	..	1
Total	12	96	1	6	114
Applications ...	..	2	..	..	2
Pending	12	97	1	6	116

New England Section

	Active	Associate	Auxiliary	Prom	Total
May Report	32	76	1	1	110
Applications ...	..	..	..	..	..
Pending	32	76	1	1	110
Total Members	32	76	1	1	110

Philadelphia Section

May Report	4	51	1	1	57
Resignations ...	..	1	..	..	1
Total	4	50	1	1	56
Transfer .....	..	1	..	..	1
Total	4	51	1	1	57
Applications ...	..	2	..	..	2
Pending	4	53	1	1	59
Total Members	4	53	1	1	59

Washington Section

May Report	2	33	..	..	35
Applications ...	..	..	..	..	..
Pending	2	33	..	..	35
Total Members	2	33	..	..	35

San Francisco Section

May Report ....	..	15	..	..	15
Resignations ...	..	1	..	..	1
Total .....	..	14	..	..	14
Transfer .....	..	..	..	1	1
Total .....	..	14	..	1	15
Applications ...	..	2	..	..	2
Pending .....	..	16	..	1	17
Total Members	..	16	..	1	17

Los Angeles Section

May Report	1	23	..	..	24
Applications ...	1	5	..	..	6
Pending	2	28	..	..	30
Total Members	2	28	..	..	30

Pittsburgh Section

May Report	1	4	..	..	27
Applications ...	1	21	..	..	22
Pending	2	25	..	..	27
Total Members	2	25	..	..	27

Plans are being made for educational courses and the committee on that subject has adopted the following resolutions:

"To accept draft submitted by the Armour Institute, through its Dean, Professor Raymond, or modifications of that draft, as suggested by members of the Educational Courses Committee, as a basis of a course which the association would ask certain educational institutions, especially in cities where the Association has Sections, to incorporate same as part of their curriculums.

"That the Committee proceed to draft a course more suitable for the electric vehicle salesman, with a view of having this course, when finally perfected, incorporated as part of a course for central stations and manufacturers, and others who might be interested."

Since last Directors' meeting, John F. Gilchrist has accepted the chairmanship of the Garage and Rates Committee. The Executive Secretary has been making an investigation of conditions on Long Island

and endeavoring to provide charging facilities at a few points. It is believed that this investigation will show that there are a few garages that could be induced to take up the charging of electric vehicles provided that we are assisted in the installation cost. A letter has accordingly been addressed to the manufacturers of charging equipment, stating that the most effective way in which their companies could help sales would be to extend a certain amount of credit to a few financially sound garages so that necessary charging apparatus might be obtained on the deferred payment plan. Very satisfactory replies have been received from several manufacturers. Similar development will be extended over the country as conditions warrant.

S. G. Thompson, chairman of Committee on Papers, has submitted a complete tentative program of papers for the convention and it is understood that the manuscripts will be sent to the General Office at least six weeks in advance of the convention, so that the papers may be printed and available practically one month in advance of the convention, thereby promoting the study and materially facilitating discussion and economizing the time necessary for presentation.

Chairman E. R. Whitney, of the Standardization Committee spoke of the desire of the Society of Automobile Engineers to have their committees treat with the standards of electric vehicle parts and practice with the electric vehicle design and equipment, and offered the following resolution:

"That as the recommended practice advocated by the Standardization Committee of the Electric Vehicle Association of America has been adopted by the American Institute of Electric Engineers, the Electric Vehicle Committee of the Incorporated Municipal Electrical Association of Ipswich, England, the National Electric Light Association, and other interested organizations, and as the Society of Automobile Engineers, now appreciating the position which the electric vehicle is designed to occupy in motor transportation, and is therefore desirous of having the electric vehicle receive due consideration from its Committees, the Electric Vehicle Association of America, upon request of the Society of Automobile Engineers, has requested that the Chairman of its Standardization Committee acquaint the Chairman of the Society of Automobile Engineers' Standardization with decisions and deliberations of the Electric Vehicle Association Committee to date; the Society of Automobile Engineers' Committee to be so constituted and operated as to give adequate consideration to electric vehicle matters, it being understood that the Electric Vehicle Association's Standardization Committee is to remain active insofar as it can be of assistance in supplementing the efforts of the Society of Automobile Engineers' Standardization Committee, and also for the purpose of acting upon matters of peculiar significance to the electric vehicle industry."

The motion being regularly approved, the Executive Secretary was authorized to bring same to the attention of the Secretary of the Society of Automobile Engineers.

E. V. A. A. GALA NIGHT

The last regular monthly meeting of the Electric Vehicle Association prior to the summer season, was held on Friday, June 19th, in the Auditorium of the Consolidated Gas Company, Irving Place and Fifteenth Street, New York City. The meeting was in the nature of a "Gala Night." Business was largely dispensed with, the audience of some five or six hundred enthusiastic boosters for Electric Vehicles being entertained by a very elaborate program, staged under the direction of Clarence L. Law, of the New York Edison Company. The performance was by strictly amateur talent

supplied by the Yonkers Electric Light & Power Company, The United Electric Light & Power Company, Edison Storage Battery Company, Westchester Lighting Company, Public Service Electric Company, Electric Storage Battery Company and the Philadelphia Section of the E. V. A. A. At the conclusion of the entertainment, which lasted until about midnight, a collation was served.

Klingelsmith Electric Truck Company has been organized in Portland, Me., with a capital stock of \$500,000 to deal in and operate motor vehicles. Officers: Albert F. Jones, of Portland, president; Albert A. Richards, of Portland, treasurer, and Jas. E. Manter, of South Portland, clerk.

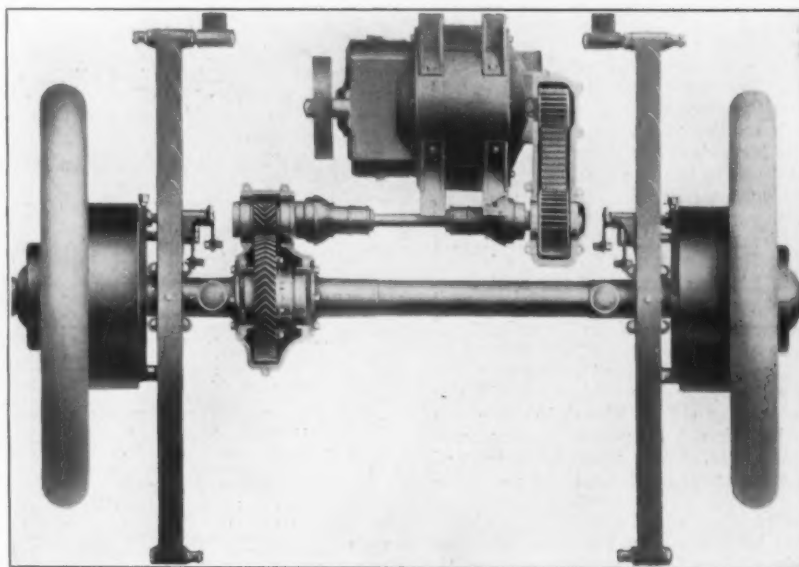
A NEW ONE THOUSAND POUND WAVERLEY WAGON

Waverley Company, Indianapolis, Ind., has redesigned its 1000-lb. wagon, which was formerly known as 83-B and now as 83-C. Among the improvements is a full floating rear axle of 25 per cent. greater strength. The brakes, both expanding on the rear wheel drums, are 16-in. diameter, give 200 sq. in. braking surface and are controlled by separate pedals.

The battery compartment is boiler-plate steel with room for different size batteries to give various mileages, ample ventilation and hold-down features. It is supported by two U-channels, reinforced by truss rods passing under the battery compartment and attached fore and aft to the chassis frame.

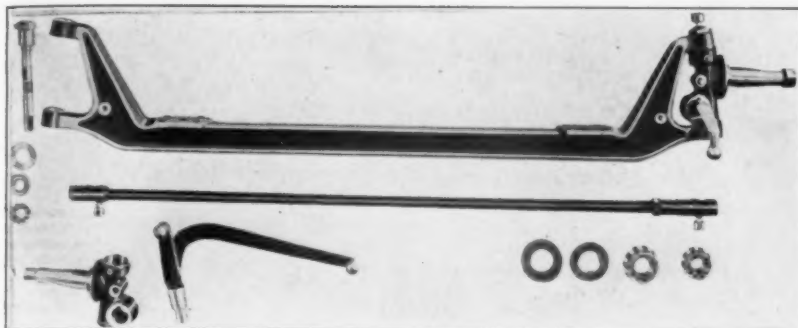


Waverley One Thousand Pound Wagon



Plan of Waverley Drive

Although this is continued almost unchanged, some details have been refined, notably much larger brakes



Waverley Front Axle and Components

The peculiar angle of the steering knuckles is such that a line through the pivot bolt strikes the ground in the center of the tire, giving easier steering and a semi-irreversible effect

Turn buckles provide for correct tension. Regular battery is 42-cell, 11-plate lead.

Nominal size tires are 38 x 4½-in. dual clincher cushion type. Price of \$2100 includes battery, ampere hour meter, hub odometer, windshield and curtains. Standard panel body is 43 in. wide at floor and 46 in. above swell, 73 in. long and 56 in. high. A speed of 14 m.p.h. and a mileage of 55 is obtainable.

A Waverley electric 1000-lb. delivery wagon recently made a trip from Buffalo

to Lockport and back bringing a 900-lb. load on the return trip in a total running time of three hours and a half. The current used on the round trip was 105 ampere hours, which, at regular rates in Buffalo, amounted to less than ten cents.

On another occasion the same car made the same round trip and about 18 miles of additional travel, or 70 miles in all on 130 ampere hours, all at highest speed, the battery having a capacity of 150 ampere hours.

NEW TWO-TON INDUSTRIAL TRUCK

This two-ton machine, known as the Hoagland-Thayer industrial truck, is manufactured by Hoagland-Thayer, Inc., Newark, N. J., and is intended for use on steamship piers, etc. It has a normal speed of 6 m.p.h.

The machine is equipped with 21 cells of A-6 Edison battery and should cover approximately 25 miles on a single charge of the battery. Motor used is 24 volt, 40 ampere, General Electric, designed to run at a speed of 1,050 r.p.m. The machine drives through the front wheels and steers by turning all four wheels.

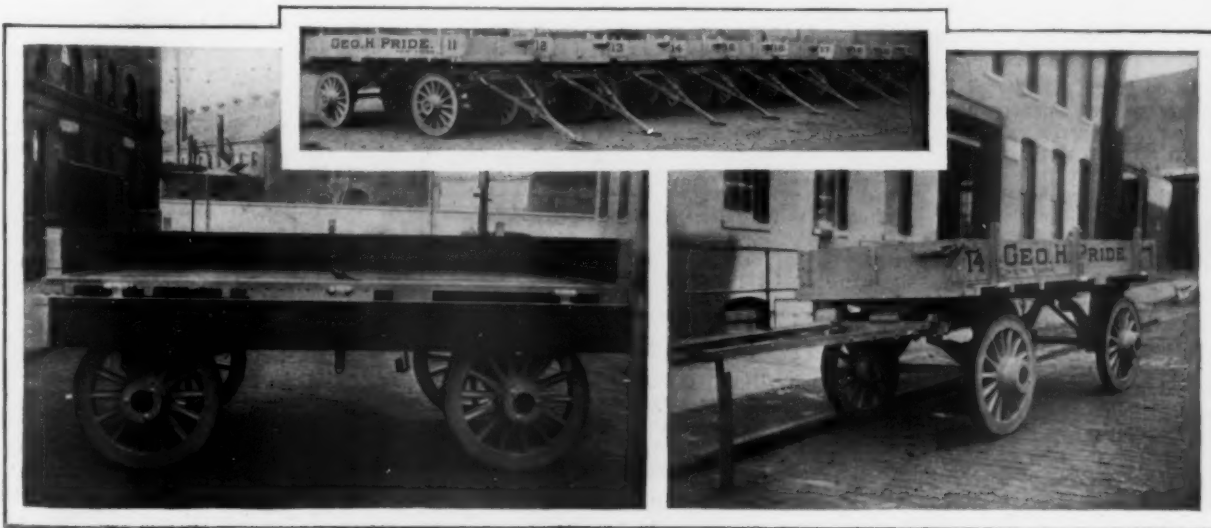
One of the interesting features of the truck is the fact that it is entirely gear driven and that all of the gears are of the spur gear type, and are enclosed and running in oil.

The battery is suspended on springs to eliminate shocks. The operator stands on the two small platforms, one of which acts as a brake and the other as an electric cut-out. The brake is always set, except when the operator's weight is on the platform. This is similar to railroad practice. By this method the power is cut off and the brake brought into service at once, should the operator fall or be thrown off.



How the Standard Lumber Company, of Sonora, California, Hauls Its Lumber With a Knox-Martin Tractor

The train consists of twelve trailers, each carrying 1000 ft. green lumber, weighing about 5000 lbs. It is hauled about one-quarter mile on an easy down grade, the trip requiring five minutes. Total weight, outside of tractors, is 37½ tons. Trucks are coupled by ¾ in. chain and grab hook. The tractor, which is working twenty hours a day, is giving great satisfaction.



Special Trailers to be Used by Contractor

These trailers were ordered of the Shadbolt Manufacturing Company, of Brooklyn, at the close of a working day. It was a rush order. By the next afternoon the designs and drawings were complete, and sixteen (working) days later the ten trailers were completed. The bodies are 12 ft. long, 5 ft. wide, 1 ft. high, inside measurement, one side hinged to drop down; wheels 38½ in. diameter, with 4 x 1¼ in. steel tires. The axles are 3 in. square, for special bronze boxes and oil cups. These trailers are designed to carry five tons at a maximum speed of 14 m.p.h. Just how they are to be used is not yet known.



Where Business and Professional Sessions Intermingled With Sports and Stunts



THE four-day convention of the Society of Automobile Engineers at the Hotel Cape May, Cape May, N. J., was a notable success, not so much from the number in attendance as from the progress made in standardization, and on account of the very excellent papers read. From a social point of view the gathering was one of the most enjoyable yet held by the S. A. E., there being some 217 members present, with their wives and families, bringing the total up to about 300. This is about half the number which attended the meeting on the Great Lakes. There is a general feeling that the attendance would have been better had the meeting been held in the Middle West, in closer proximity to the center of the automobile industry. This will probably result in next year's meeting being held in the vicinity of the Great Lakes. Perfect weather prevailed during the entire meeting, and the numerous sports were greatly enjoyed by the members, somewhat to the detriment of the attendance at certain of the professional sessions.

Attendance at the meetings was much better on board the City of Detroit, Ill., a year ago, not alone on account of the larger number participating in the outing, but on account of the fact that members could easily keep track of the papers and enter the meeting by the numerous side doors, without disturbing it, to listen to the portion most directly of interest to them, and could then leave without passing around in front of the members in session. It is believed that this feature alone will insure a large attendance at the professional sessions when held on board ship. At Cape May those who were interested in but one paper during a session, hesitated to go in at all, as they had to either disturb the members present by coming in at the time of the paper, or sit through the reading of papers which were not of direct interest to them, as there was but one door and that at the front of the hall.

The professional sessions were interspersed by entertainments in the form of moving pictures and stunts by the various sections. On Saturday, the business being

closed on Friday, the day was given over to a most elaborate series of athletic events on land and in the water, prepared by the very efficient Entertainment Committee under the leadership of F. E. Moskovics. Some handsome silver trophies were awarded the winners of these events, and the scenes on the beach will be long remembered by those present.

S. A. E. PROGRESS

Standardization Results

REPORTS ACCEPTED:

Progress Report Ball and Roller Bearing Division

Reduction from 287 sizes to 47

Broaches Division, with Slight Changes

Electrical Equipment Division

Single-wire system

Motor Testing Division with Slight Changes

Iron and Steel Division

Pleasure Car Wheels Division

Reduction from 50 tire sizes to 8

BUSINESS AND PAPERS:

New Constitution Adopted

Student Enrollment Provided For Seventeen Papers Read

Standards Committee Session

Notwithstanding the recreation and play, much was accomplished at this year's meeting. The work of the society consists largely of standardization and research. There were twelve reports by the divisions of the Standards Committee which held its meeting on Tuesday at 2.45, under the chairmanship of Henry Souther.

Of the twelve division reports that of the Iron and Steel Division was the largest, and was adopted as recommended practice by the society. The new specifications

embodied in this report will be found further on in this issue.

The report of the Standard Rim Test was also accepted, as well as the Insulation Tests by the Electrical Division. The reports of all the committees were accepted, some of them merely reporting progress, but much valuable work was shown to have been done by the committees and the society is a long step closer to its goal of standardization.

Report of Broaches Division

The first report was that of C. W. Spicer, chairman of the Broaches Division. This report was adopted after some slight alterations in the wording to make it clearer, that in regard to four-spline practice they referred to its use in the change gear box and not at the ends of the propeller or axle shafts. The design offered for the four-spline shaft has the circumferential bearing surface of the large diameter and the small diameter practically the same.

New Steel Specifications

The report of the Iron and Steel Division was read by P. W. Zimmerlied. It was recommended that in numbering the specifications, the hyphen be dropped between the two numbers, and that the phosphorus and sulphur content of carbon steels be specified as .045 per cent., and .05 per cent., respectively, except steel No. 1095 phosphorus in which is to remain .04 per cent. Also that the manganese content of No. 1020 be specified as .30 to .60, instead of .50 to .80, .45 being the desired per cent., also that classification of nickel chromium steels into low and medium be discontinued. About fourteen other specifications were dropped. Three new nickel chrome steel specifications, however, were substituted. Those dropped were found to be unnecessary and not generally used. The low limit of sulphur was placed at .045 per cent., chromium .45, and phosphorus as before .04. Sixteen nickel chrome vanadium steels were dropped and three new ones substituted. The increase in permissible sulphur was prompted by commercial considerations.

It is not the object of the S. A. E. to specify always the purest obtainable materials, but to be guided by practical commercial considerations. After a very brief discussion the report was adopted.

The Electrical Equipment Division Report

The brief report of this division centered on the discussion of the single wire versus double wire system. It was pointed out by Henry Souther that the adoption of any of the reports merely made them recommended practice, and that it did not necessarily follow that all manufacturers should change their methods the next day, but that if the recommended practice was good they would eventually shift over to it, and the recommended practice would then become really a standard. The discussion which was taken part in by W. H. Conant, Wm. H. Palmer, Jr., E. E. Sweet, A. B. Libby, and A. L. McMurtie was summed up by Jos. Bijur. The general trend was toward the single wire system, and the point was made that next year at least 60 per cent. of the makers were planning to use this system. The report which recommends the single wire system was accepted after a lengthy discussion of the relative merits of the single and double wire systems.

Insulation Tests Settled

The recommendations of the division as to insulation tests were also accepted and were stated by Mr. Conant to be made to forestall more drastic measures on the part of the National Board of Fire Underwriters with whom the division had consulted.

Ball and Roller Bearing Division

The report of this division by David Fergusson was largely one of progress of reducing ball bearing types and sizes from 287 down to 47, which really meet the requirements. The bearing makers are co-operating with the exception of one. The report was accepted.

Lock Washers Discussed: No Report

The subject of lock washers was brought up by Chairman Souther, and opinions asked of members as to their experience with the S. A. E. standard washer. This resulted in an objection that the light sections would sometimes be deformed by drawing up the nut tight and that occasionally brittleness of the washer had given trouble. Chemical specifications of materials was suggested.

Pleasure Car Wheels Division

The work of this division has resulted in suggestions for standard hydraulic tests of rims. The report was read by E. R. Hall, Experimental Engineer of the Goodyear Tire and Rubber Company.

The tests of the division show that certain of the larger sizes should be strengthened.

Only eight tire sizes were recommended, 37 by 5 was also suggested, and this together with one or two oversizes are being considered, and may perhaps be recommended.

This division is also attempting to standardize demountable rims so that uniform size and weight felloes can be used. Tire makers in general favor this standardization work. The report was adopted.

Motor Testing Division

The suggested report forms for motor testing were brought to the attention of the society by Herbert Chase, who read the report of the division. This was a final revised report continued from the January meeting. The objection that the forms did not have sufficient room for details was met by the explanation that research test forms were to be issued later. With some suggested changes the report was adopted.

Report of Miscellaneous Section

This session which was very well attended was closed by the report of the Miscellaneous Division. Standard specifications of gasoline and oil and the spark plug shell and the pins for standard yokes, also license pads, were brought up. The erroneous impression that the spark plug standard threads were to be changed on account of the standardization of the shell was removed. It was shown that larger porcelains necessitated a change of the shells and the hexagonal part above the thread. In regard to gasoline specifications, much difficulty is expected.

Souther suggested that flexible shaft ends for speedometer drives be standardized by this committee, and Howard Coffin proposed the standardization of headlight dimmers. This question was referred to the Electrical Equipment Division. This closed perhaps the best meeting which the Standards Division has ever held.

Business and Professional Sessions of Wednesday

Wednesday morning was spent in recreation and sports and the business session was called at 2.45 P. M., the members being officially welcomed and given the freedom of Cape May City by Mayor Cas-

sidy. His remarks were followed by President Leland's address, the hall being packed.

S. A. E. Remembrance From the I. A. E.

General Manager Clarkson called attention to the handsome reading desk which had been sent by the members of the foreign engineering societies to the S. A. E. in recognition of courtesies extended to them by the society in 1913. He then read the treasurer's report, which showed the society to be in first-class financial condition, with new members coming in rapidly. The report was adopted.

Amendments to the Constitution

Many changes were proposed in the Constitution, all being on the side of more detailed and definite regulations made necessary by the growth of the society. There was considerable discussion on the subject of nominating committee and how it should be appointed. This was entered into by Messrs. Guy Wall, R. McA. Lloyd, F. E. Moscovics, Howard Coffin, A. B. Cumner, and the final motion by David Beecroft was passed, that three of the seven members of the nominating committee be proposed by the largest sections, and the other four by general vote.

Major Wilson proposed a change in the Constitution so that at the age of twenty-six a junior member could, by applying to the council, defer his transfer to regular membership to the age of thirty, as under the present Constitution the council could not grant such a request, but must of necessity transfer or drop the member. This change was adopted. The subject of student membership was brought up, and provision made for a student enrollment, and a motion providing for the enrollment singly or in groups of students for a



Members of the S. A. E. and Their Friends, on the Steps of the Hotel Cape May
This was all that the photographer was able to gather at one time, boating, fishing, tennis, and the beach being too strong attractions. The S. A. E. party numbered about three hundred

period of three years, and with dues of \$3 was passed. Student members are entitled to attend general meetings, and are to be supplied the monthly bulletin of the society. They have no vote. Upon motion by Henry Souther the very carefully drawn amendments and changes in the Constitution were adopted. As copies of the proposed amendments have been in the hands of the members for some time, they are not herewith recorded.

1915 Meeting Discussed

The second invitation of the Panama Pacific Exposition for the society to hold its meeting in California was read, but the general opinion seemed to be that this was too far from the industry's center. Coffin's proposition that the meeting for 1915 be held on board a lake steamer, starting from Buffalo, stopping at Cleveland, Detroit and Chicago, with professional sessions on board, and side trips at other times, was enthusiastically received. The time suggested was early in June, before the steamers went into commission for their regular summer business. The business session closed at a quarter of five, many of the members having left after the president's address.

Professional Sessions

The meeting immediately passed into a professional session, a progress report of the Research Division being given by Clarkson. This was accepted.

The report of Henry Souther, of the Iron and Steel Division, was accepted without discussion, Mr. Souther pointing out that the committee was endeavoring to obtain data which would show just what S. A. E. steels will do, the method employed being to have the members fill out blanks, plot curves of performance, etc. He urged upon all members to earnestly co-operate in this manner.

The Miscellaneous Division report was then read by J. G. Utz, who stated that the blue prints of the plugs were not yet ready, but had been settled upon and that the plugs would be interchangeable with old plugs. He stated that the pitch diameters were not consistent with standard threads, and that they were adopting what

might be termed a finger fit so that when the plug was loosened by wrench it could be screwed out by hand. The report was accepted.

Thursday Sessions

In the absence of President Leland, who had returned west, Vice-President William G. Wall conducted the meeting, which was open to 10.30, just an hour later than the



Reading Stand Presented by the I. A. E.

This handsome illuminated reading stand was presented to the S. A. E. by the members of the Institution of Automobile Engineers and the Society of Motor Manufacturers and Traders, of England, as a token of appreciation of the hospitality received while guests of the S. A. E., last summer.

schedule. A day letter congratulating the Aero Club of America on its completion of the hydro-aeroplane America, with which it is proposed to cross the Atlantic, was moved and seconded.

This was followed by the report of Henry Souther, of the Pleasure Car Wheels Division. The suggestions for recommended practice for rim tests was adopted, to go into effect June 1, 1915. Mr. Souther referred to the eight-tire sizes recommended, which are as follows:

Tire Seat Diameter	Rim Sizes	Tire Sizes
24 in.	30 x 3	30 x 3
23 in.	30 x 3½	30 x 3½
25 in.	32 x 3½	32 x 3½
24 in.	32 x 4	32 x 4
26 in.	34 x 4	34 x 4
25 in.	34 x 4½	34 x 4½
27 in.	36 x 4½	36 x 4½
27 in.	38 x 5½	38 x 5½

These take the place of fifty sizes now listed by tire makers, and take care of at least 85 per cent. of the present demand. A discussion followed, in which A. O. Parker, David Fergusson, E. R. Hall and Henry Hess took part. Tire sizes as a whole were satisfactory, but 37 by 5-in. tires were recommended to the committee

for their consideration and possible inclusion in the list. It was pointed out by Mr. E. R. Hall that a 36x5-in. rim would be a more satisfactory combination than a 37x5 in. The committee will consider the addition of a few oversize tires.

The Papers

The first paper was that of E. R. Hall on S. M. M. T. standard rims. It was in the nature of a criticism. This paper pointed out the unsystematic methods of the foreign manufacturers in rim sizes, and that the tolerances which the manufacturers allowed themselves were so large that often rims of the same size varied sufficiently to make trouble. The S. M. M. T. standards for clincher rims, which have been more or less generally adopted abroad, were suggested to the S. A. E. as a standard, except in the matter of tolerances, and that a letter be sent to the Society of Motor Manufacturers and Traders of Great Britain, explaining the objections of the committee to the unusually large tolerances allowed.

Mr. Hall then read his paper on a suggestion for the standardization of pneumatic tire rims, in which he explained that the standardization of the wood felloe diameter was of paramount importance, and then the standardization of the felloe band, and finally that of the contour of the rim. It was pointed out that the Clincher Tire Rim Association had made no attempt to standardize the felloes or bands. He stated that quick detachable rims were being displaced by demountable rims.

J. E. Hale's Paper on Truck Tires

The load ratings of solid rubber tires offered the standardization problem of the Truck Standards Division. This complicated subject was summarized. He discussed what he termed commercial properties, operating conditions and physical properties of tires, and in the general discussion of the paper which followed the subject of hard or soft rubber compounds was repeatedly referred to, stiff compounds giving high mileage with lower resiliency than softer compounds. He spoke of tests which he proposes making to obtain mileage, and load curves of tires, from which he hopes to be able to determine the most economical sized tire for any load. Russell Huff spoke of tests which he recently made which led him to believe that an increase of from 50 to 100 per cent. in



The Prize Winners of Athletic Events

From left to right: J. Edward Schipper, proved to be the all-around S. A. E. champion; S. L. Murphy, water dog; Frank Martin, fat but fleet; R. H. Coons, who bowls them over.



Car Fitted With Entz Electrical Transmission

Great interest was manifested by the members in the Entz transmission. Reading from left to right, those in the view are: Messrs. Hatch, R. M. Owen, Entz, and Major Wilson.

mileage can be obtained by variations in the compound of the rubber.

B. B. Bachman discussed the type of drive and the distribution of the load and that tire life is largely dependent upon abuse, that it is more important than resiliency. The truck maker should look after the protection of the power plant from vibration when solid tires are used. He further stated that their experience with pneumatic tires had shown that, largely owing to increased speed when so equipped, there was no resulting economy. Anglada spoke of variations in tire requirements, according to the speed of vehicles. Power absorption of tires was also discussed, and Mr. Hall explained that loss from this source could be predetermined. Briefly, his method is as follows: By stretching a section of rubber of the

diagram, the area being proportional to the loss caused by deforming the rubber.

On account of the starting, lighting and electrical transmission papers having slides, they were held over for the afternoon session.

Thursday Afternoon Session on Electrical Transmission

The paper on electrical transmission for motor cars by J. B. Entz proved unusually interesting to the members; in fact, the reading of the paper and the discussion which followed occupied practically the entire afternoon, so that it was impossible to get to the other papers or the report of the Electrical Equipment Division scheduled for that meeting.

The Entz system was contrasted by him to the usual electric transmission, in which

be considerably reduced by the use of high speed motors. The discussion was entered into by a large number.

Starting, Lighting and Ignition Devices

A. D. Libby then read his paper of the above title, which was largely a description of a starting and lighting system operating on twelve volts, and of a new inductor type ignition magneto. He made a plea for the two-wire system, believing that the single-wire system is dangerous. He recommended fuses being inserted in the starter system, suggesting specifications for such fuses. In the discussion which followed the six- and twelve-volt systems were spoken of, and also the practicability of fuses in the starter circuits. There seemed to be a feeling that fuses are not a good thing, and might greatly embarrass the



On the Beach

In the lower left is shown members of the S. A. E. in strength contests; the right shows the fat men in full flight; the upper right, Moskovics and his perfect lady friend, Mr. Conant; at the left, some of the Indians after their dip in the brine. The insert shows Wilkinson and Souther studying transportation problems.

composition to be tested and measuring the tension for different amounts of stretch, and then allowing the rubber to gradually come back to its original position, and then again note the tension required for different amounts of stretch, it was determined that the tension was greater during the stretching period, and less during the return period. From these results a diagram can be plotted, somewhat resembling that of a magnetic hysteresis

the energy of the gasoline motor is turned into electricity, and that again converted into mechanical energy. During the discussion the comparative weight of the electrical transmission system and the parts which it replaces were brought out, showing them to be about the same. The loss in the electric system on the direct drive was shown to be very slight, in the neighborhood of $2\frac{1}{2}$ per cent. It was also shown that the weight of the transmission could

operator, and that makeshift connections might be used if fuses were not handy.

A. P. Brush's paper, that of A. Ludlow Clayden, R. W. A. Brewer and C. T. Myers and the Ideal Car discussion were postponed, and the report of the Electrical Division taken up. The first part was accepted, and the second part referred back to the committee, to be reported upon again in January. The report of the Electric Vehicle Division was also omitted, and the



The Indiana Indians and Some Others

Big chief Moskovics and his band, who were very much in evidence on many occasions, and added piquancy to the events

report of the Broaches Division by C. W. Spicer was accepted.

Friday's Professional Sessions

On Friday morning H. E. Harris read his paper on tap drill sizes and causes of stripped threads, extracts of which were published in the last issue of THE COMMERCIAL CAR JOURNAL. This was followed by C. T. Myers, who abstracted his paper on Power and Performance of Gasoline Motor Trucks, this paper being held over from the day before.

The report of the Motor Testing Division was then read by Herbert Chase, and was accepted, with minor changes.

N. B. Pope read the paper on "Engineering Basis for Taxation of Motor Vehicles" in the absence of its authors, C. O. Egerton and S. I. Fekete.

The Ideal Car

Considerable publicity was given to the fact that views of the ideal car were to be had at the meeting. The subject was opened by the paper "Scientifically Correct Distribution of Material," by A. P. Brush. He asked the question whether engineers in developing chassis elements had been as consistent as had the buying public in its demands in regard to body arrangements and external appearance. This was followed by a discussion which was opened by C. E. Davis, who outlined his ideal car, embodying in it a starting and lighting system, an electrical transmission, a motor without poppet valves and a worm drive. Herbert Chase gave his views of the ideal car, which included a four-cylinder motor of high speed type in preference to a six. A. Ludlow Clayden's paper, editor of the English Automobile Engineer was read by Joseph A. Anglada, subject, "The Highest Quality Six-Cylinder Chassis for America." Clayden's paper called attention to the difference in the attitude of the buying public in Europe and America on six-cylinder cars. In Europe the four-cylinder is more than holding its own, while in America the public seem to demand six-cylinder cars if above a certain price limit.

W. A. Brewer's paper was also read by Anglada, on "Tendencies in European Car

Construction." He brought out the features most likely to sell well in Europe, and it was shown that his specifications tallied closely with those of the Rolls-Royce. He also covered the tendency in the design of bodies, especially with reference to accessibility, as well as covering other details of the construction.

The discussion which followed was quite lengthy and entered into by many members. As may be well imagined, there are as many ideal cars as there are individuals, but as this is hardly a subject for a commercial car paper, we will not burden our readers with details.

Electric Vehicle, and Ball and Roller Bearing Reports Adopted

The Electric Vehicle Division's report of progress was adopted as read, as was also the progress report of the Ball and Roller Bearings Divisions.

This ended the professional sessions.



Members of the New York Contingent Who Perpetrated the Trial

The above members of the New York group, all of whom will be instantly recognized by their friends from their characteristic poses, furnished much amusement by their extremely clever and humorous mock trial. Attention is called to the latest Parisian fashions as exemplified by "Belle Chase," in the center of the group.

Sports and Entertainment

As before mentioned, Big Chief Moskovics carried out to a successful finish his elaborate plans of entertainment, ably assisted by his committee. On Thursday evening entertainment was provided by the Metropolitan, Detroit and Indiana sections of the society.

The Mock Trial

The New York section added to the merriment by a trial.

Cast of Characters

Judge Rumhauser.....Joseph A. Anglada
I. Skinem, Plaintiff's Attorney,
Orrel A. Parker
W. E. Robbem, Defendant's Attorney,
J. E. Schipper
John Rambler Bulcycle, Defendant,
John R. Cautley
Annheuser Bosch, Truck Owner,
A. J. Poole
Miss Cyclecine Bloomerstripe, Witness,
Herbert Chase
Officer Beatit, Motorcycle Police,
F. W. Tarbold
Officer McGinnis Pinchem, Fixed Post
CopTheo. Marburg
A. Pedestrian, Witness for Defense,
N. B. Pope
I. Screwemdownhard, Garage Mechanic,
T. B. Brown
Budweiser Bull, Truck Driver.

C. F. Clarkson
Dan, Court OfficerAustin E. Potter
Prof. Sae, Expert Witness..H. C. Wilson
Foreman of the Jury.....A. B. Cumner

This proved to be somewhat of a knock on the little brother of the big car, called facetiously the "sickly" cars, one of these being driven by an automobile engineer accidentally picked up a soubrette who happened to be stepping from the curb somewhat higher than usual and put her foot into the car, and in its mad career in an endeavor to avoid being stepped on by a pedestrian, it ran under a Saurer truck, thereby damaging the shaft and rear axle



LET the Firestone Service Shop of your city stand back of your delivery system. It means minimized expense and multiplied reliability.

In the large trucking centers owners will find a Firestone Service Station complete enough to rebuild truck wheels when necessary or to standardize equipment.

If your trucks are not yet equipped with Firestone Quick Removable Rims of S. A. E. Standard, turn truck by truck in now to be standardized.

Then your own drivers can at any time, anywhere, change a tire, even on heaviest trucks, in a few minutes with perfect ease and sureness.

Firestone Tires, suited to your needs, on Firestone Rims, backed by Firestone Service Station help in emergency, insure lowest cost and highest efficiency.

Write for Truck Equipment Catalogue—then call a Firestone man for consultation.

Firestone Tire & Rubber Co., Akron, Ohio— BRANCHES AND DEALERS EVERYWHERE

"America's Largest Exclusive Tire and Rim Makers"

Pneumatic Tires, Truck Tires, Pleasure Electric Tires, Carriage Tires, Cycle Tires, Fire Apparatus Tires, Rims, Tire Accessories, etc.

Firestone

TRUCK TIRES

When Writing, Please Say—"Saw Your Ad. in the C C J"

construction and blocked the traffic. The skit was very clever, many hits being made on various things pertaining to the automobile industry. The Saurer truck was defined as one which "turns without moving." Herbert Chase posed as the *soubrette* and was the hit of the evening.

Moving Pictures

The Detroit section entertained those present with moving pictures, the trials of various engineers, such as C. C. Hinckley, of the Chalmers Company, and John Wilkinson, of the H. H. Franklin Company. In the trial of Mr. Hinckley it was brought out that there was really no need for engineers any longer, since Henry Souther and his Standardization Committee had so standardized the parts that merely a clever purchasing agent was now required. Mr. Wilkinson was charged with being an enemy of big business in not using sufficient steel in the cars and running on too little gasoline to suit the oil trust.

Enter the Indians

The Indians, after assisting in the trials, chanted a new version of their wigwam song, led by Big Chief Moscovics, in which many hits were made on the Standards Committee, Ford, Charley Hall, Cole and the English engineers.

The annual banquet took place in the main dining hall on Friday evening. The affair was extremely informal, and, judging from the popping of corks, was much enjoyed, especially by the bibulous contingent. A serpentine parade largely of the same contingent closed a most enjoyable dinner, the members then adjourning to the ballroom to enjoy a talk on the coming second S. A. E. European tour, which will start from New York on October 9th, and end at the same place November 22d. It is planned to spend considerable time at the Paris show and in Paris visiting the manufacturing establishments, thence to Turin and Milan, Italy; Lucerne, Switzerland; thence to the famous Falls of the Rhine, the Mercedes factory at Stuttgart, down the Rhine to Cologne, to the Krupp Steel Works at Essen; thence to Antwerp, Belgium, and to the Olympia Show at London. Views of the various scenic points and the factories were given.

Athletic Events

On Saturday afternoon, the work of the Mid-Summer Meeting having been disposed of, all betook themselves to the veranda or the beach to witness the foolishness of the grown-up boys, at other times very dignified engineers. The events opened by a parade, and it was noticeable that a moving picture man had been attracted to the spot. The line of march led at last upon



The Ideal Car

As personified by a member of the Detroit section. There are those who do not agree that it operates on milk alone.

the beach, where the party broke up. A ball game was the feature of the afternoon. There were also foot races for the fat men, broad jumps, etc. A rather novel spectacle was afforded when the party in their gala colored costumes betook themselves to the water. If they were smeared and streaked before going in, they were



"Sports" on the Beach

It isn't often that you get an engineer up in the air, but here is proof that such things do happen. As you can see, it is a battery man. Clothes don't always make the man

certainly more so when they came out.

Thus ended one of the most enjoyable and profitable Mid-Summer Meetings of the society.

Salient Features of the Presidential Address of Henry M. Leland

President Leland, as usual, dealt with his engineering subjects from an entirely new angle. "Technically," he said, "I am not an engineer," and pointed out that when he started in 1858 technical schools as of today were practically unknown, and that his training in engineering lines was the result of years of experience in the development and improvement of manufacturing methods which have so greatly changed in the last fifty years. He begged leave to treat of a matter even broader than that of the engineering profession, but at the same time enlarge upon the fact that the "achievements which the world enjoys today may justly be placed to the credit of the engineering profession."

He referred to all of the great advancements of our times, such as the trans-Atlantic liner, great bridges connecting cities like New York and Brooklyn, the Panama Canal, giant buildings, fast moving trains, tunnels, cables connecting the Old and New World, and the innumerable mammoth problems which have been successfully solved. He places the engineer at the top of the pinnacle of civilization.

From this point on his remarks cover the broader field referred to, the following paragraph being typical of the trend of his speech.

"Nevertheless, great and valuable as have been the achievements of the engineer, I believe there is a larger field which he may occupy if he will. This relates to the engineer, rather than to his achievements. To wrest from nature the secrets of matter and forces, and to bring order out of chaos is a great satisfaction. To investigate, to contemplate, to labor and bring forth the ideal is the task of the engineer. From the vantage point of my years and my experience, may I suggest to you new engineers of a new industry, that in the whole realm of engineering there is no problem so worthy of your skill and ingenuity, and no need so pressing, as that of producing men, not things. No task is so complex, and no reward is so great as that which comes to the man who successfully engineers his own life to a higher type of character. In the laboratory of daily life, with the mind, heart and conscience as tools, we should, as engineers of the greatest things, convert our baser tendencies and impulses into the noblest realities."

Making Two Blades of Grass Grow

Later in his address he quoted an old saying, "He who makes two blades of grass grow where only one grew before is a benefactor of the human family," and showed how this statement applies to all achievements.

He compared the standing of engineers in foreign countries with that of the engineer in America, pointing out that his higher standing in Europe was due in a large part to the Great Federation of Engineers which gives a far reaching and important dignity and standing to the profession. He said, "I hope that measures will be taken in the not distant future to have all engineering societies in the United States join in a like organization."

In his closing remarks he had some very good words for the Society of Automobile Engineers and for its active officers, particularly of Secretary Coker F. Clarkson, the administrative council, the standards and other committees, whose untiring work has raised the society to its present standing.

What the Bush Terminal is Doing With Its Battery Truck Cranes

OVER in Brooklyn there is an unique establishment which has grown with prodigious strides from a very small beginning, because it embodies a new idea in the handling of factories and freight. Mr. Bush's conception of enormous factory buildings of the most up-to-date character, in which factory space could be rented, together with shipping service, has resulted in a plant and piers which now cover some three hundred acres.

The accompanying illustration, taken from a balloon, gives a very fair idea of the present appearance of the Bush Terminal. There are seven enormous piers or docks, one of which alone has an area in its upper and lower level of seven acres, and is claimed to be the largest dock in the world. Here are daily shipped by train and boat or unloaded from ships a tremendous amount of all kinds of merchandise, including plumbago in barrels, cotton bales, and the contents of refrigerator ships; in fact, every conceivable commodity is handled by the Bush Terminal. Enormous factory buildings are being continuously added and rented and the goods manufactured, handled by the Bush Company. Reduced cost due to co-operative and centralized labor is the factor claimed.

To facilitate the handling of the enormous quantity of merchandise every known modern method is being adopted as fast as consistent. Among these modern appliances may be mentioned the battery truck cranes manufactured by the General Vehicle Company, of Long Island City. These vehicles have been mentioned before in our columns, but this is the first time that any detailed study of their performance has been given. Four of these small vehicles, the cranes of which have a lifting capacity of one ton, were purchased in the summer of 1912.

The vehicles are of short wheelbase fitted with a battery on the chassis frame with a crane and electrical winch at the forward end. No merchandise is carried on the vehicle itself, but special heavily built trailers with iron wheels of broad tread and running on plain cast iron bushed bearings, are used. As high as three trailers are employed with each battery crane.

Economy Shown Over Mules

When it is understood that these highly specialized pieces of machinery take the place of simple three-wheeled dock trucks of the cheapest kind hauled by mules, it means something to state that they are showing a decided economy. Briefly, the cost has been figured down so that it now reads \$1 per hour for the vehicle with three trailers. This includes driver's wages, upkeep, and everything pertaining to the possible cost of operation. The truck driver is paid 20 cents per hour, and laborers in the particular section of the yard where the truck is working are assigned to help load and unload. The mule drivers were paid 15 cents an hour for ten hours' work, but one driver now takes the place of four. The economy, of course, is made possible by the fact that the vehicles travel much faster than the mules and that with four trailers, as often carried, they displace four horses and four men at 40 cents per vehicle. With the electric truck cranes only one driver is required.

These cars are powered by a forty-four-cell Philadelphia W. T. thirteen-plate battery. Two-year service is now obtained from two batteries, in fact it was found advantageous to supply two sets of batteries to each car. At noon the cars are run into the garage, the company maintaining its own, and here the partially exhausted battery is removed, and a fully charged one put into its place, so that continuous service for the entire working day

can be had without fear of battery depletion. The other battery is charged during the night. Current for this work being estimated at \$.03 per kilowatt hour.

At the present time, trucks are fitted with Firestone tires, being guaranteed for 8000 miles service, and more than this is averaged.

A consistent study has been made for some time of the performance of these vehicles which are used in hauling from the piers to the trains, and vice versa. For the purpose of a more accurate study the vehicles are now fitted with hubodometers so that from now on it will be possible to keep a more accurate mileage record. It is estimated that the cranes do about three times the work of horses and mules, and at the same time as the vehicles are fitted with electric cranes, they lift packages, bales, etc., up to one ton in weight into the cars, thus doing away with scoops and stationary or portable electric hoists, as formerly used. These required a man in attendance. His place is now taken by the driver of the vehicle. As an example of the work which is being done, a typical three-quarters of an hour shows that one of these cranes carried during that time 8642 lbs. of merchandise in thirty-two packages on a haul from store 57 to pier 3, about 1500 ft. in length. One of the longest hauls is that from 57 to pier 6, which is a distance of 4000 ft. Most of the hauls are less than a half mile in length, which makes the economy shown, all the more pronounced. Where trailers are used each carries some five to six bales of 400 to 600 lbs. each in weight, while from three to four is the maximum load on a horse truck.

A Time Study

By reference to the accompanying curves some idea of the service which is being rendered can be had. These show the amount and class of service to which the



Bird's-eye View of the Bush Terminal, Brooklyn, Taken From a Balloon

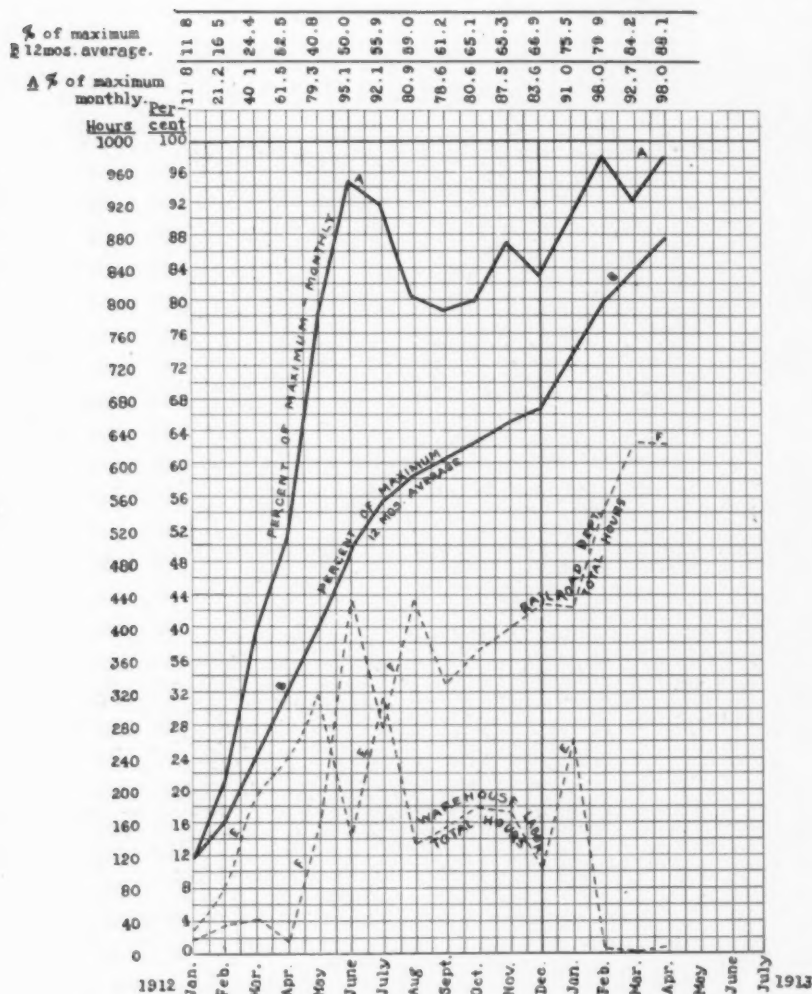


Table of Curves Showing Work Performed by Battery Crane Trucks
For explanation see text

battery crane trucks have been put. The figures used as a basis for the curves were obtained from the monthly reports of the head timekeeper.

The heavy line A shows the percentage of the total possible time each month during which the crane trucks are actually in service. The number of working hours each month were based on nine hours per day, for all days except Sundays and holidays. During the first six months that the trucks were in service in 1912, a very rapid increase is noted in the percentage of possible working time. At the beginning in January there were but two trucks in service. These worked but 11.8 per cent. of the time. By March, 1912, there were four trucks in service averaging 40.1 per cent. of the total time, while in June, 1912, the trucks were in service 95.1 per cent. of the time, and from that on until the present the proportion of time in service has varied between 80 and 98 per cent.

It must not be construed that the idle time was due to repairs. Part of this was due to lack of work, and in the winter to weather conditions.

It was noticeable that as the men became more familiar with the trucks the work was better laid out to eliminate idle time, and

mechanical difficulties were done away with. The purchase of extra batteries also added to the efficiency of the vehicles, as they were enabled to complete a full day's work. In February and in April 1913, the trucks were actually in service 98 per cent. of the available time. There is no record kept of the overtime, and this would tend to balance some of the idle time. The time out of service due to repairs or overhauling is estimated to be not over 2 per cent. over the months covered.

Referring again to the diagram, line B is a progressive average of the separate monthly percentages of the maximum time in service. This month this line is continued as the twelve months average line after the first year by dropping the earliest month each time a new month is added on.

Naturally, this curve is much lowered by the influence of the low record made during the first four months of the year. It shows, however, that during all of 1912, the trucks were in service an average of 66.9 per cent. of each month's possible time during the months of January, February, March, and April of 1913, this curve rises very rapidly. For the twelve months ending April, 1913, the trucks were in service 88.9 per cent. of the time.

Curve E shows the number of hours that the trucks were in service on warehouse labor. This warehouse labor consists of receiving and delivering fibre, coffee, and general merchandise.

Curve F gives the number of hours during which the crane trucks were in service for the railroad department, loading and unloading freight cars.

The firm is also using two four and a half ton Saurers and one five-ton Gaggenau for general hauling outside of its yards. It is believed that more of the battery truck cranes will be put on as a result of the satisfactory service they have given. This is a noticeable example of efficiency of motor transportation on short hauls.

THE NEW YORK WIRELESS TRUCK TIRE SERVICE STATION OF THE B. F. GOODRICH COMPANY

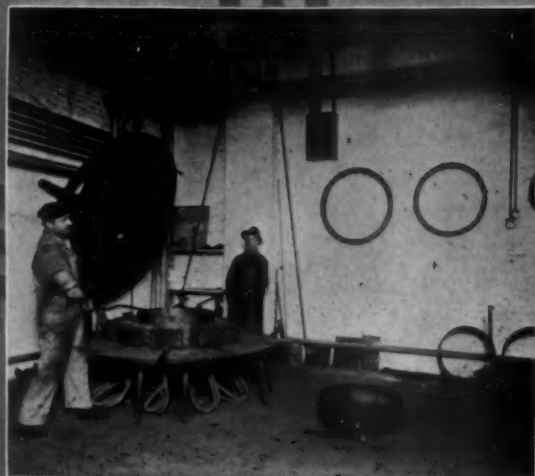
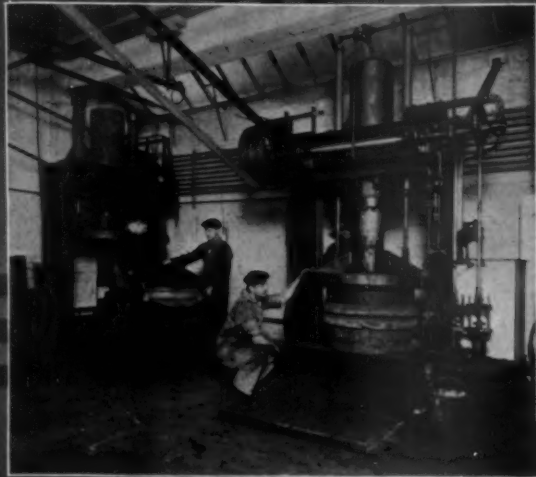
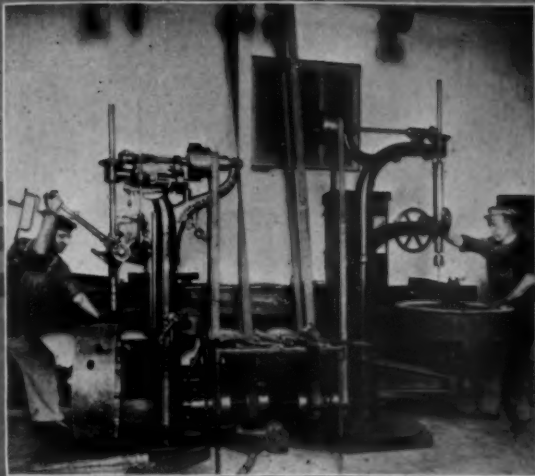
Goodrich Service in New York City centers in an up-to-date, fully equipped station at 605-609 West 48th Street, between Eleventh and Twelfth Avenues. The station is easily accessible to the railroad terminals, where much heavy trucking is done, and is also accessible to most of the service stations of truck manufacturers.

The station occupies three floors, 75x100 ft. in size. The first floor contains a garage and shop with a capacity of nine trucks. All work is done on one floor, and a great saving of time is effected by this arrangement. The second floor is used as a stock room, where a large stock of tires is on hand at all times. The third floor is devoted to stock and to an auxiliary garage. All three floors are connected with an extraordinarily large elevator. A competent force is maintained at all times to give everyone's requirements immediate attention. The adjusters have their headquarters in the service station, and are available at any time.

The shop equipment includes two hydraulic presses, one of one hundred tons and another of one hundred and fifty tons. These presses are built on solid granite foundations to insure firm support. The forging and heating equipment with hydraulic cooling plate, battery and drill presses for demountable tires, are features of the shop. There are also woodworking machines for altering wooden wheels, which are necessary in making "changeovers" from other tires to "Goodrich." This woodworking machinery consists of the latest devices for building wheels to the S.A.E. Standard. Fourteen men are employed in the station and have made as many as seventeen "changeovers" in a day. The changing of tires has run as high as one hundred a day, which is well within the capacity of the station.

Primarily intended for users of Goodrich wireless truck tires, this modern service station is open for orders from any truck owners. Its purpose is to produce finished tire or wheel renewals by experts at cost, whether such renewals are necessitated by natural wear or by accident.

The War Department at Washington has bought three Lippard-Stewart trucks of one and a half ton capacity. These are for use on the Mexican frontier.



New York Motor Truck Tire Service Station of the B. F. Goodrich Company

Reading from left to right: Two types of drill presses for various kinds of work on the wheels.—A 150 ton hydraulic press for applying pressed-on type Goodrich wireless tires.—Gas heaters for heating wheel bands before application to wheels.—Application of demountable tires in the shop garage without removing wheel from truck.—Elevator, connecting the three floors.—A corner of the stock room, which occupies the entire second floor, 75 by 90 feet.

The Truth About Trucks in Service of Uncle Sam, for War Purposes

(Continued from Page 16d.)

United States Method of Purchasing Trucks

In connection with trucks for use of the Quartermaster Corps, advertisements of the

bodies, and is not one that has ever been on the market for bids. It is merely shown as a sample.

Army Attempting to Standardize Truck for Military Use

It is very evident that the government without having made a general and thorough public test of all vehicles on the market that might be entered is endeavoring to standardize a truck for military use. The following is a communication from the Quartermaster Corps to the manufacturers of motor-driven vehicles, and following it

such a type would also limit competition and would be a violation of the law.

5. With a view to assisting this corps in arriving in the near future at a suitable standard type of motor truck for military use, it has been decided to invite various manufacturers to submit to this office their views and any suggestions they may desire to make regarding the development of a suitable truck.

6. You are therefore invited, if interested in this matter, to communicate with this office as to your views with regard to the feasibility and practicability of the development of a standard motor truck to fulfil the requirements of the attached specifications and the conditions set forth in the attached memorandum.

7. It is believed that the truck most suitable for government use would also be the one most satisfactory for general use in cities and country districts where the roads are over a varied terrain, and streets and roadways have not been completely paved.



Jeffery Four-Wheel Drive Undergoing Tests

These remarkable pictures of more remarkable roads were taken during some recent tests of the Four-Wheel Drive Jeffery truck made for the Army. The truck was loaded to capacity, as shown, with pig iron and negotiated the gumbo roads. At times the mud was over the axles, yet the car pulled out under its own power. One of the Jeffery trucks in the Quartermaster's Corps is shown in the upper right; another is just going into service in the signal corps, with a wireless outfit.



government requirements are run for a few weeks, and specifications are stated. Anyone can submit a bid. Occasionally all bids will be rejected and another set of specifications put out, and more bids solicited. This, of course, is very discouraging to truck manufacturers, as there has been no general test by the government as yet to determine which of the present types of vehicles are most suited.

Individual tests have of course been made here and there by interested army officers but there has been no comprehensive or far-reaching tests such as the French Army trials. The results of these trials are purely local and the war department is no nearer a knowledge of the types of vehicles best suited than before these tests were made. As a rule, the government buys the chassis and then special bodies are fitted. Herewith is reproduced specifications and line drawings of a special body for the machine department for the aeronautical corps. This is merely a sample of the type of specifications sent out for such special

are the specifications of a one and a half ton truck which are very typical of those drawn up by the army.

Subject: "Development of Standard Motor Truck for Military Use."

GENTLEMEN:

1. From practical tests made with motor trucks in connection with the operation of troops in the field, this office is of the opinion that this means of transportation will be of great value to the military service, provided a standard truck can be developed and adopted.

2. It is necessary in the development of a standard motor truck for army use that all essential parts of the truck shall be interchangeable, in order that the government will not be required to keep a variety of spare parts on hand with which to make repairs to trucks of different manufacture.

3. In order, also, to avoid eliminating competition and limiting the purchase of such a truck from one manufacturer, which would be a violation of the law, it is highly desirable that the motor truck adopted for army transportation shall be a standard truck and one that can be manufactured by several of the present manufacturers of motor truck or automobiles.

4. In the development of a standard truck it is also essential that the type of engine, magneto etc., shall not be covered by patents which are still running, as the adoption of an engine of

8. In other words, a truck to be suitable for adoption for army use must have the following essentials:

(a) Capable of being manufactured by all the principal manufacturers of automobile trucks.

(b) Interchangeability of parts.

(c) Capable of fulfilling the test conditions enumerated in the memorandum attached hereto.

9. It is requested that your replies be addressed to the Chief, Quartermaster Corps, Washington, D. C. By direction:

Very respectfully,

CHAUNCEY B. BAKER,
Lieutenant-Colonel, Q. M. Corps.

SPECIFICATIONS FOR STANDARD MOTOR TRUCK FOR MILITARY USE

Capacity—3000 lbs. of load in addition to all equipment as specified in the paragraph "weight" herein. Truck must safely carry 20 per cent overload.

Drive—The truck shall be shaft-driven, either two- or four-wheel drive at the option of the builder.

Axle—Axle to which power is applied shall be semi-floating or full-floating type, at option of builder.

Motor—12 to 40 h.p., at option of builder, especially designed for heavy duty and with four (4) cylinders of suitable standard design, either

of the L head or T head type, at option of builder. Cylinders to be water cooled and cast of high grade cylinder iron. Dual ignition by magneto and battery. Motor preferably to be mounted on three-point suspension and placed under removable bonnet forward of driver. Motor placed under driver's seat will not be accepted.

Clutch—Cone, leather faced, or multiple d.s.c. at builder's option.

Transmission—Selective type, four (4) speeds forward and a reverse. Gearshaft and brake levers to be center control.

Speed—From one (1) to fourteen (14) m.p.h.

Wheels—Wood, artillery type, 36 in. in diameter, with demountable rims. Mudguards for front and rear wheels attached to frame. No running board.

Tires—Solid rubber, S. A. E. Standard Demountable, 36x4 in. Double on rear wheels.

Tread—36 in.

Wheelbase—120 in. to 144 in., at option of builder.

Steering—Irreversible wheel, located at left side. Extra heavy.

Brakes—Two sets, both attached to rear wheels; one set operated by pedal, other by lever (center control). Brakes to be non-sparking and easily adjusted. The adjustments to be securely locked without removing wheels or other parts.

Frame—Pressed channel steel, heat-treated.

Chassis—The chassis shall be so designed that the standard Army Escort Wagon body can be placed thereon, the inside dimensions of which are 3 ft. 4 in. wide, 1 ft. 9 in. deep, 9 ft. 6 in. at bottom, and 10 ft. at the top, sloping equally at each end (bodies are not to be supplied with trucks unless specially called for.)

Top—Collapsible cover over driver's seat, with side curtains.

Height of Body Platform from Ground—Not to exceed 45 in.

Ground Clearance—11 in. or more.

Weight—The net weight of the completed and fully-equipped truck including gasoline tank, oil tank, radiator, accessories, etc., and spare parts, including non-skid chains, shall be indicated in the proposal.

Equipment—One Prest-O-Lite gas headlight, complete with tank and piping, headlight located on dash, with directing device; also steel bumper in front of radiator with swivel-towing hook, with sufficient strength and suitable in design for use in extricating stalled truck; steel towing hook at rear end of frame in center for same purpose and suitable for attaching trailer. The above equipment is in addition to the usual equipment of side and tail lamps, tools, jacks, etc.

Gasoline Capacity—25 gals., and 5 gals. in reserve.

Oil Capacity—3 gals.

Material and Workmanship—All parts of the truck and motor with respect to quality of material and workmanship, shall be in accordance with the latest developments of standard makes of motor trucks for equal service in winter and summer.



Reo Truck in Service of the Michigan National Guard

This model J truck has been in the Michigan National Guard service and all its branches, for more than a year. It is used for hauling equipment from the armory to the station enroute for camp, for hauling equipment from the station to the camp, for hauling commissary supplies, not only in camp, but on "hikes." When not in camp service it is used for general trucking in the Quartermaster's Department, in the city of Lansing.

Tests—The trucks shall be so built as to stand any reasonable test that the Government may require in its military service, and bidders should state what special tests they are willing to have made with the truck; any tests made to be with the full load carried including the chauffeur and one other person.

Engine Speed—The normal number of revolutions per minute of the motor in the fourth speed which corresponds to the highest speed, should be stated.

Arrangement and Control—All principal parts of the truck, such as motor, clutch, transmission, control, drive and all other mechanical parts, must be conveniently arranged and easily accessible.

Quietness—The running of the truck must be reasonably noiseless.

Seats—Seats shall be provided for three persons including the chauffeur, and shall be protected from the weather by curtains and covers.

Cooling System—The cooling system should be ample for the truck under all conditions. Water to be pump-circulated and under operating conditions should be maintained below the boiling point, and suitable provisions should be made to prevent waste and slopping.

Standardization—All parts must be standardized and interchangeable for a given make of car. Bidders shall state in their proposal the manufacturers of the motor, axles, bearings, transmission, tires, and magnetos.

General—Bidders should mention all features, or details of design, of any truck proposed by them differing from the above specifications.

The Military Motor on Peace and War Footing

By OUR FOREIGN CORRESPONDENT

IT is for military transport that the greatest value is placed by European governments upon the military motor, though in the problem many difficulties have to be faced. There is a very big difference in the requirements of a nation's armies in peace and on a war footing, and consequently military authorities have to choose from two alternatives: either they can buy and always maintain during peace a number of cars excessive enough for war requirements, or they can themselves acquire and work sufficient only for their requirements during peace, contracting or impressing from private sources the additional cars necessary in time of war.

The Two Alternative Methods

The first of these methods has one great advantage. When a country goes to war it is of the utmost importance to strike as quickly as possible. When, therefore, cars are wanted on a war footing, they are wanted badly, for the importance of rapid mobilization cannot be overrated, and with

all the required cars in possession of the army authorities, the transport columns can obviously be mobilized more quickly than on any other system, provided the cars are properly maintained during time of peace. We see this reflected in the fact that the Italian army authorities work on these lines, for undoubtedly the imminence of the war in Tripoli helped to force them into taking this line, although they were also doubtless largely influenced by the comparative paucity of commercial cars in use in their country—a condition of affairs partly owing to the badness of the roads, partly because Italy is far from being a rich country. This comparative scarcity of mercantile automobiles has also driven Russia to adopt the system; but, while this method facilitates quick mobilization, it also means a very heavy expenditure of capital, which is consequently during times of peace locked up, unless the cars can be used during peace for other purposes.

The second method we find generally employed in the countries where road and manufacturing conditions have led to the

cult of the commercial car being comparatively advanced; but in these countries we find very material divergencies, both as to the type of cars used and the degree of encouragement afforded to the private owner, the latter ranging from the \$550 paid to owners in Great Britain to \$2250 in Germany. This, of course, is practically a matter of supply and demand. In Great Britain, where the automobile truck is more used than in any other country—in other words, the available supply is greatest—the demand is smallest, for, under present conditions, the British army has no need for more than 1000 vehicles. The Continental nations, with their gigantic armies and, if anything, smaller supplies of cars upon which to draw, present a very different problem, the degree of difference being reflected by the amount of the subsidy.

There are, however, certain underlying requirements common to all nations in arms, though they may not be completely filled by a subsidy scheme, which inevitably means making the best of what one has at disposal. If it be possible, too, for the

army authorities, by their subsidy encouragement, to bring about for private use a type of truck perfectly suited to motor requirements, it will only be after years of cautiously directing the current into the channels of their requirements, and that stage has certainly not yet been reached. For instance, the ideal arrangement would be for all the cars of an army to be of a single type, or at any rate of types the main parts of which are absolutely interchangeable with each other, but not with those of potentially opposing forces; at present, however, the governments have to be content with only a very moderate degree of interchangeability.

Present Standardization—An Example From Great Britain

If we take the case of Great Britain, for instance, even though the laws of supply and demand enable the military authorities in this country to lay down far more stringent regulations than elsewhere, we only find standardization in such matters as the arrangement of the screw threads, control arrangements, bearings, towing hooks, tank filler caps and filters, grease cups and radiators, while in other respects, such as engines, transmission, springs, etc., only broad requirements are specified. In the matter of transmission, it is worth noting that, while originally final bevel drive to a live back axle was regarded as essential, worm-driven vehicles are now accepted if they can prove their worth; but, in any case, side chains are absolutely barred, chiefly owing to the possible results if the back wheels, as they often may do on active service, sink into loose ground.

As, however, the main details of the requirements for the British army vehicles have already been published in these columns, there is no need to go into further details. The particulars which we have given serve as an example of the most stringent European military requirements, and for the rest it will suffice to take a broad view of the stipulations made by each government working on the subsidy system.

The French Scheme

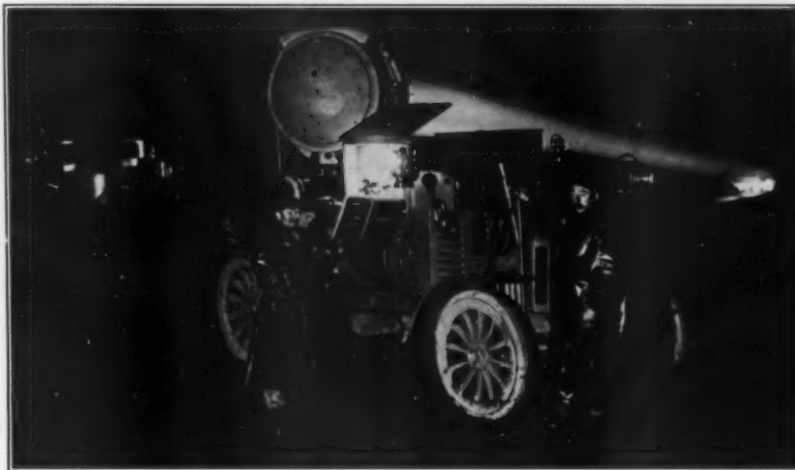
France specifies broadly for trucks taking two tons or more of useful load, with a maximum weight limit on the back axle, but is open to subsidize machines with or

without trailers, or even complete road trains. A fairly high speed is expected of the French army cars. Though France has a considerable number of first-class manufacturing firms, the number of users in that country is smaller than in Great Britain, though larger than in Germany. Consequently, we find the subsidy placed at a figure greater than that of Britain and less than that of Germany, and for a three-ton lorry the total amount of the subsidy amounts to \$1500.

ernment certificate for making subsidized trucks.

Germany the First to Subsidize

The German military authorities use the heaviest type employed by any army in Europe—trucks capable of carrying four tons, complete with a two-ton trailer—although of late the Germans show a distinct tendency toward a rather lighter vehicle, as the old type is considered too heavy for the frontier roads. The horse power of the

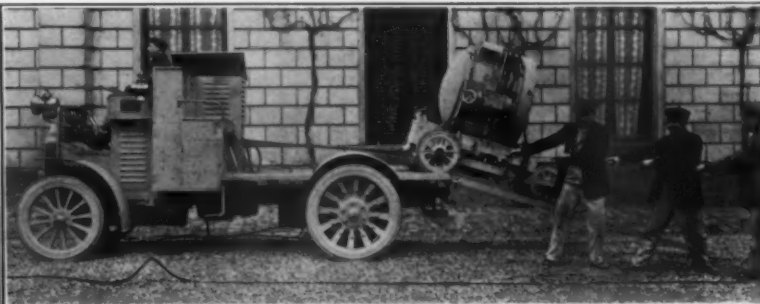
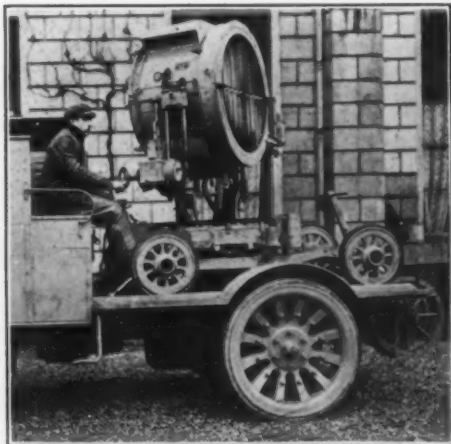


The De Dion Traveling Searchlight at Work

One feature to which the French have given particular attention is the transport of artillery, and for that purpose they really brought about the introduction of the four-wheel drive tractor, which is as yet only at the practical beginning of its career. We shall hear much more of it in the future.

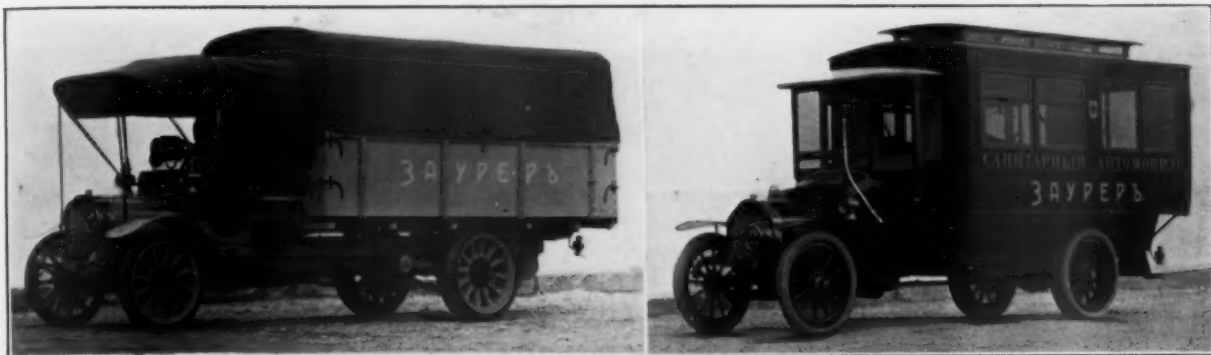
All subvention schemes are largely a matter of inspection to ensure value for money, and the payment of that money in the form of subsidy, and inspection in France is carried to a higher degree than in any other country. Not only do government officers stamp all parts of subsidized vehicles at the makers' works, but restrictions are placed on the nationality of workmen in works that obtain the gov-

German trucks is 35, and the available platform area 64½ sq. ft. Only rubber tires are allowed, and though many at first thought such tires unsuitable for trailer hauling, their wear has not proved unduly excessive. Germany was the first country to introduce a subsidy scheme, and this was brought forward with the intention of building up an industry in the use of commercial cars; for, when first the subsidy scheme made its appearance, German manufacturers were building almost entirely for export, the number of users in the country being almost negligible. That is why the German Government pays such a heavy price—\$1950 per road train (that is, the car complete with trailer), or \$1000 for the truck by itself. Until last month \$2000



Big Projectors Used by French Army

The left view shows the electric searchlight in position ready for working in conjunction with the 18 h.p. engine of the De Dion car on which it is mounted. Showing also how the big projector is raised to the truck platform.



Two Saurer Products Used by Russian Army

On the left is shown a wagon for hauling supplies, while the other illustration shows an ambulance



Truck and Trailer Used by German Army

A typical 1913 truck and trailer complete, to comply with the German Army subsidy requirements. The vehicles in question are made by Gebrüder Stöwer, of Stettin



UNDERWOOD & UNDERWOOD, N. Y.

The Automobile Ironclad

Two views of what is probably the most novel as well as modern use of the automobile, the armored car of defence used by the Italian army in Tripoli. It is the most perfect war machine made, and it is the belief that in the very near future, the armies of every modern nation will be equipped with these "ironclads" on wheels. The caps of two officers of the army can be seen just above the revolving turret of the fighting automobile.

was paid for a road train. The method of payment is \$360 at the time of purchase and \$160 annually for four years on each truck.

In case of war, private cars would probably be commandeered, and with this in view, the German Government has just taken a census of available machines, as a result of which it appears that Germany can call upon approximately 20,000 motor cycles, 50,000 private cars and 7700 trucks, in addition to the 80 complete trains of trucks with trailers and 80 motor cars already possessed by the army.

Austria Follows Germany

The small number of manufacturing firms in Austria, quite as much as the comparatively few users, has led to the relatively high subsidy in that country of \$1850 for a three-ton truck complete with two-ton trailer. This type has to fulfil certain stipulations in the matter of track width and weight, and owing to the mountainous country in which they would probably be called upon to operate, they are geared comparatively low (to an average of six miles an hour as compared with twelve in Great Britain and nine in France).

While the Austrian subvention scheme has been founded on the model of that of Germany, the German type of truck is approximating more and more nearly to that of Austria.

Italy and the Automobile in Tripoli

We have already hinted that the war in Tripoli was the factor that decided Italy to purchase her military motor trucks instead of subsidizing them. At the outset of this campaign the Italian military authorities were sceptical about the value of the motor for their work. However, two F.I.A.T. trucks which were sent out did so well that they were shortly followed by thirty more, and finally about two hundred F.I.A.T. utility cars were in commission for this campaign. The uses they were put to were most varied: besides the ordinary transport work of taking troops and ammunition to the front and taking the wounded back, many of the machines were utilized to work searchlights, while others were fitted up as telegraph stations, and others



Close View of Aeroplane Trucks

This shows the framing on two-wheeled trailer, to be covered, for carrying aeroplane wings

again as workshops for the aeroplane section (practically every European army has its traveling motor workshops attached to the aircraft sections now). Again, several cars acted as sort of land "destroyers," and equipped with quick-firing guns, their mobility often enabled them to repulse raids.

It is not too much to say that the motor truck rendered a great part of the campaign in Tripoli possible. It was only thanks to the motor truck that the Lequi division were able to operate at distances of from 70 to 200 miles from their base in a desert.

Lessons From the Balkan War

But while the larger powers have foreseen the future possibilities of motor traction in war, the smaller and less advanced have had the motor truck—like greatness—thrust upon them, and this by its own effectiveness. With the Greek army in the Balkan War, it taught some useful lessons, and considering the miscellaneous and non-descript nature of the aggregate of automobiles used, the extreme dearth of those who knew the first thing about an automobile and the almost entire absence of

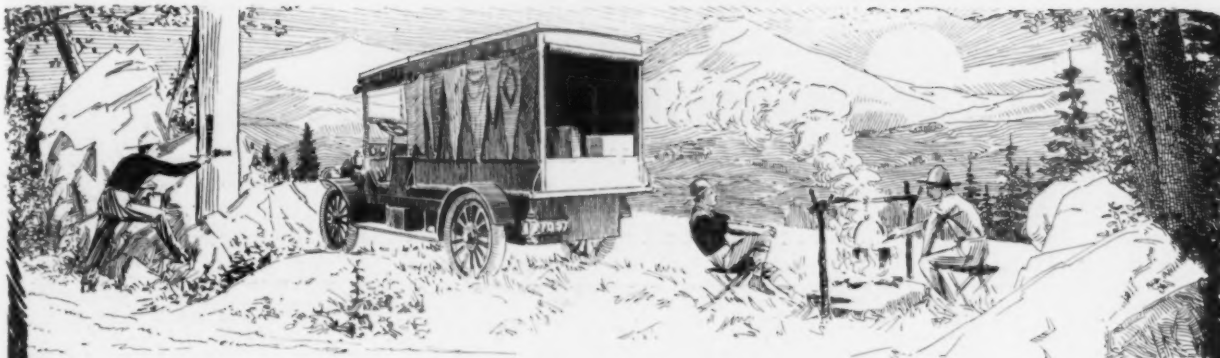
garage and repair facilities, the results that the automobile truck gave under these conditions were truly marvelous.

After the fall of Preveza the Greek army pushed on against the Turks covering Janina, and from a base 50 miles at the rear, the Greek commander was faced with the problem of provisioning an army that gradually increased from fifteen thousand to sixty thousand men, and extended over a front of 100 miles. It was under these conditions that thirty F.I.A.T. and Itala trucks were shipped to Preveza, and it was found that, while each lorry could in 3 hours carry to the front sufficient provisions for one thousand men for one day, it took a convoy of six mules two and a half days to carry up a net load of 800 lbs., for two of the mules had to carry food for themselves and the other four. On the return journey, too, the six mules could only take five wounded, who naturally traveled with the greatest discomfort, yet even improvised motor ambulances accommodated six, transporting them in a little over 2 hours, and in this matter the automobiles saved hundreds of lives.



Vehicles in the French Army Service for Carrying Aeroplanes and Spare Parts

French Army Vehicles: 3—Truck carrying workshop, tools, etc., for repairing aeroplanes. 2—Special machine for carrying wings. 7—Touring machines for monoplanes.



The Auto Trail Blazing Association
has paid a signal honor to the

Bessemer Truck

in selecting it as the motor vehicle with which to make one of the largest trail blazing trips ever made. The truck, under the direction of A. L. Meigs, of the Automobile Trail Blazing Association, started from New York and is now on its way to Seattle, Washington. All along the route, from start to finish, trees, telephone and telegraph poles are being painted in different colors, according to a pre-arranged signal system, so that any motorist may travel from ocean to ocean, without any knowledge of the country, simply by following the marks on the trees and poles.

The BESSEMER TRUCK was chosen because of its well-known efficiency, its remarkable reliability and its oft-proved ability to overcome obstacles that may be met in the course of travel.

The smallest of the three BESSEMER models was selected because this \$1250 truck showed itself fully adequate for the task before it. Its strength and capabilities are shown by the fact that, though rated as a one-ton truck, it is carrying a full ton of paint in addition to its force of men, their personal effects and camping paraphernalia, for they live in the truck during the entire trip.

Sturdiness is built in every inch of the BESSEMER, from radiator to tail gate. Before leaving the factory each truck is subjected to a test that is many times more severe than it will ever receive in service.

Three Models Fit Every Truck Requirement. Bodies Built to Suit Purchaser

Model "C," 25 H. P., \$1250 Chassis
1 ton capacity, chain drive

Model "A," 30 H. P., \$1800 Chassis
1½ to 2 tons capacity, chain drive

Model "D," 30 H. P., \$2300 Chassis
1½ to 2 tons capacity, worm drive

Dealers: Get our proposition—it's a live one

BESSEMER MOTOR TRUCK CO., Grove City, Pa.

BRANCHES:

Boston
Pittsburgh

A. C. VANDERPOEL
Export Representative
18 Broadway
New York City



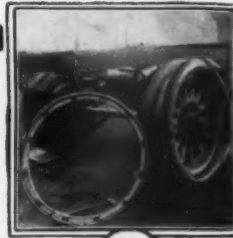
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United States Motor Truck Tires

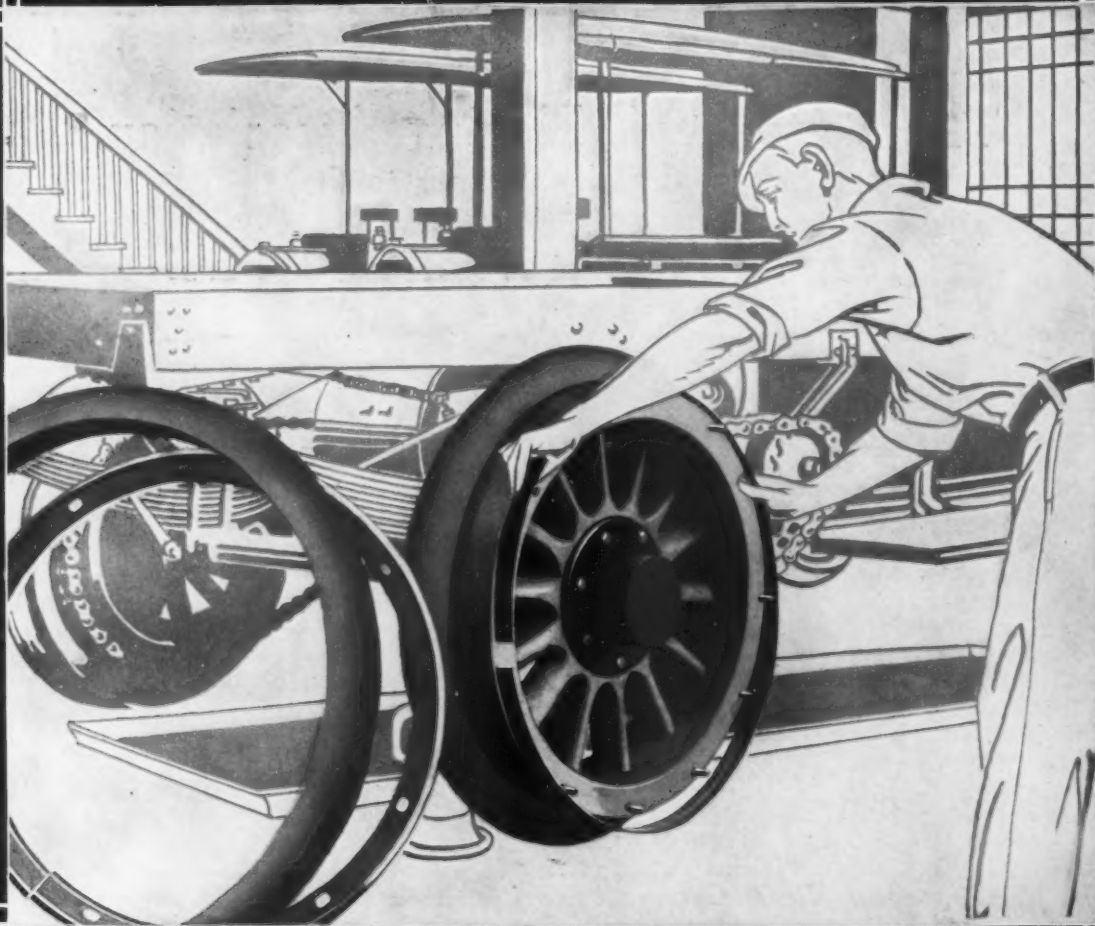
Demountable

Motor Trucks equipped with United States Tires show the maximum saving over horse-drawn trucks.



1

2



THE UNITED STATES TIRE COMPANY maintains real service stations in the following cities

Atlanta, Ga., 21 Houston St.
Baltimore, Md., 1102 Cathedral St.
Birmingham, Ala., 423 S. 20th St.
Boston, Mass., 560 Commonwealth Ave.
Buffalo, N. Y., 733 Main St.
Butte, Mont., Cor. Park and Idaho Sts.
Charlotte, N. C., 14 S. Church St.
Chicago, Ill., 1222 Michigan Ave.
Cincinnati, O., 1121 Race St.
Cleveland, O., 1908 Euclid Ave.
Columbus, O., 89 North Third St.

Dallas, Tex., 2109 Commerce St.
Dayton, O., Second and Jefferson Sts.
Denver, Colo., 215-217 16th St.
Des Moines, Iowa, Masonic Temple
Detroit, Mich., 243-245 Jefferson Ave., E.
Fresno, Cal., Masonic Temple Bldg.
Grand Rapids, Mich., 17 Library St.

Hartford, Conn., Allyn and High Sts.
Houston, Texas, 706 San Jacinto St.
Indianapolis, Ind., 527 North Capitol Ave.
Jacksonville, Fla., 804 Main St.
Kansas City, Mo., 1815 Grand Ave.
Los Angeles, Cal., 923-925 S. Grand Ave.
Louisville, Ky., 904 S. Third St.

Milwaukee, Wis., 454 Milwaukee St.
Minneapolis, Minn., 1522-1524 Hennepin Ave.
Newark, N. J., 276 Halsey St.
New Haven, Conn., 238 George St.
New Orleans, La., 609 Baronne St.
New York, N. Y., Broadway at 58th St.
Oklahoma City, Okla., 508 N. Broadway
Philadelphia, Pa., 329-331 N. Broad St.
Phoenix, Ariz., Cor. N. Central Ave. and Fillmore St.

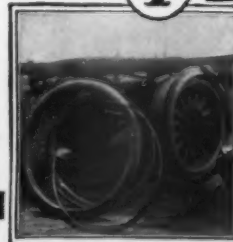
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Pittsburgh, Pa., 5929-31 Baum St., E. E.
Portland, Ore., 24-26 Fifth St., North
Providence, R. I., 18 Snow St.
Richmond, Va., 709 W. Broad St.
Rochester, N. Y., 195 East Ave.
Salt Lake City, Utah, 132 East Second So. St.

San Antonio, Texas, 433 Main Ave.
San Francisco, Cal., 50 Fremont St.
Savannah, Ga., 307 Bull St.
Seattle, Wash., 212-216 Jackson St.
Spokane, Wash., 1011-13 First Ave.
St. Louis, Mo., 3149 Locust St.

Syracuse, N. Y., 117 W. Taylor St.
Tacoma, Wash., 1316-18 A St.
Toledo, O., 218 North Erie St.
Washington, D. C., 1303 H St., N. W.
Wilkesbarre, Pa., 60 North Main St.
Worcester, Mass., Graphic Arts Bldg.

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UNITED STATES TIRE COMPANY
1790 Broadway, New York City

When Writing, Please Say—"Saw Your Ad. in the C C J"

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Chicago	Galveston	Minneapolis



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New York	St. Louis	Toledo
Omaha	St. Paul	Washington
Philadelphia	Salt Lake City	Wilkes-Barre
Pittsburgh	San Francisco	Youngstown

THE CANADIAN H. W. JOHNS-MANVILLE CO., Ltd.
Toronto, Montreal, Winnipeg, Vancouver



The Warning Signal that Leaves Nothing to Chance

A mechanical horn, built to last as long as the car, independent of batteries, wires, etc.

LONG HORN
INVENTED BY G. F. LONG

produces a warning note varying at will from a polite request to an insistent demand.

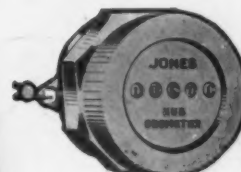
As flexible as the human voice, rising clear, sharp and strident above the street racket.

Handsome in appearance. Easily attached, and, once installed, requires no attention.

Write for booklet

COVERS THE CONTINENT

EVERY automobile accessory advertised in connection with this emblem is a proven product, backed by the resources and reputation of a firm over half a century old, and sold *plus* the assurance of a reliable Service now in actual operation in every important city of North America.



Supplies Indisputable Record of Mileage

so necessary in figuring the cost of maintenance and the efficiency of motor vehicle equipment.

That is why you need the

JONES HUB ODOMETER

The simplest of all mileage-recording devices. Replaces the regular hub cap. Records backward as well as forward travel.

Provided with a means of sealing, therefore absolutely tamper-proof.

Furnished for all standard makes of vehicles.

Price, \$20

Write for descriptive booklet



Only the Best Brake Lining is Good Enough for Truck Brakes

The almost continual strain which truck brakes must undergo makes it a matter of economy as well as safety to select the most durable and reliable brake lining obtainable. There are many reasons for the superiority of J-M Non-Burn Brake Lining.

It does not contain a particle of perishable material. Pure, long-fibre Canadian Asbestos, reinforced with strong brass wires and woven to uniform thickness and texture

J-M NON-BURN BRAKE LINING

Stops the truck instantly or gradually, as desired. J-M Non-Burn has the sure grip that stamps it thoroughly dependable.

Write for copy of "Practical Pointers on the Care of Automobile Brakes."

J-M (Mezger) Soot-Proof Spark Plug
J-M Dry Batteries

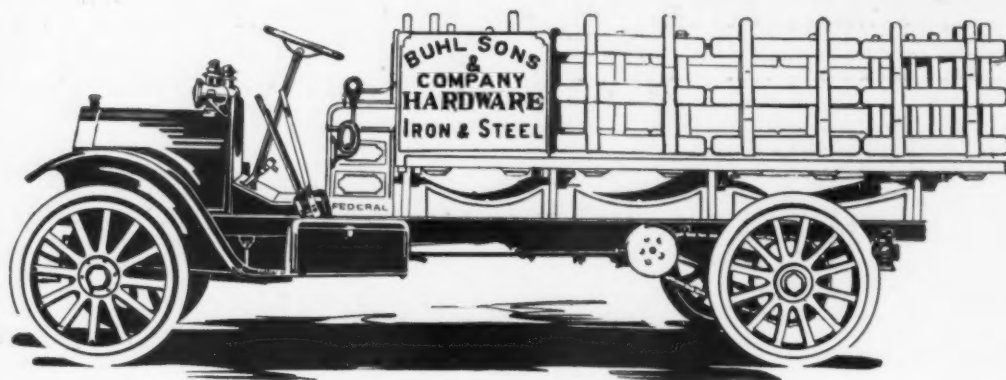
OTHER JOHNS-MANVILLE ACCESSORIES
Write nearest Branch for booklets

Carter Carburetor (Multiple-Jet)
J-M Automobile Tape

(2548)

H. W. JOHNS - MANVILLE CO.

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FEDERAL OWNED BY THE BUHL HARDWARE COMPANY

FEDERAL

Better Delivery Service at Less Cost

That has been the uniform experience of Federal users in dozens of different lines.

Federal trucks cost less than the horse equipment they replace.

The upkeep and maintenance averages less than half of the horse equipment required to do the same territory.

Your delivery radius is greatly widened—you can cover territory with a Federal that horses cannot reach.

You can reach more customers at less expense.

We can demonstrate these facts to you beyond a doubt—if we can't prove them to your satisfaction and our own, you cannot buy a Federal.

Federal Motor Truck Company

158 Leavitt Avenue

DETROIT, MICH.

When Writing, Please Say—"Saw Your Ad. in the C C J"

GASOLINE TRUCKS **GMC** ELECTRIC TRUCKS

GENERAL MOTORS COMPANY

All Records Broken!

During the month of May (June records not yet available) we received **more** orders,

Built more Trucks,
Shipped more Trucks,
Delivered more Trucks,

Than during any month in our history.

All of this in the face of what some people are pleased to call a depression among the concerns who buy trucks.

What's the Answer?

GMC Trucks at our present prices and bought under our square deal policy **reduce** the operating expenses of those who use them.

Remember that the **GMC** Line comprises both gasoline and electric trucks, in load capacities from 1000 lbs. to 6 tons.

If you are interested in motor trucks, as a dealer or as a user, now, or for the future, you should read "Truck Talk." It will cost you nothing but a request—a postal card will do.

GENERAL MOTORS TRUCK COMPANY

One of the Units of General Motors Company

Pontiac

Michigan

DIRECT FACTORY BRANCHES:

New York
Chicago

Philadelphia
Kansas City

Boston
St. Louis

Detroit

GENERAL MOTORS TRUCK CO
 Pontiac Michigan
 Please send me copy of "Truck Talk."

C. C. J.

When Writing, Please Say—"Saw Your Ad. in the C C J"

Worm
Drive

SIGNAL

Chain
Drive

MOTOR TRUCKS

"FULLY GUARANTEED ON SOLID TIRES"

The worm and chain drive jobs are identical, with the exception of the drives, and strictly standard throughout—Continental Truck Motor—Timken Axles and Bearings—Detroit Springs—Gemmer Steering Gear—and many other well known and proven units of the same high quality.

A glance at the specifications will convince you of the unusual merit of the Signal—The price is very reasonable, considering the quality—and if you will take the time to go over your list of live prospects you will find that nearly every one is a logical Signal buyer. The capacity fits their haulage requirements.

Sum up the truck situation in your territory and let us hear from you.

WORM DRIVE MODEL

Timken—David Brown
Worm Drive Rear Axle
Timken Front Axle and Bearings
Continental Motor
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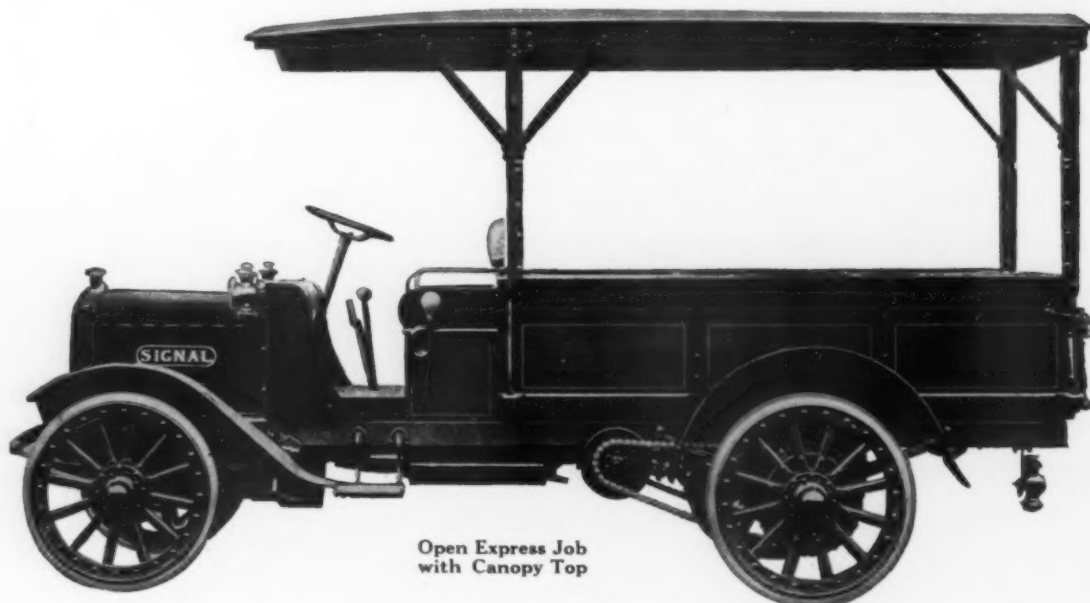
CHAIN DRIVE MODEL

Timken Axles and Bearings
Russel Jackshaft
Covert Transmission
Gemmer Steering Gear
Continental Motor
Stromberg Carburetor
Hartford Clutch

\$1500 Chassis

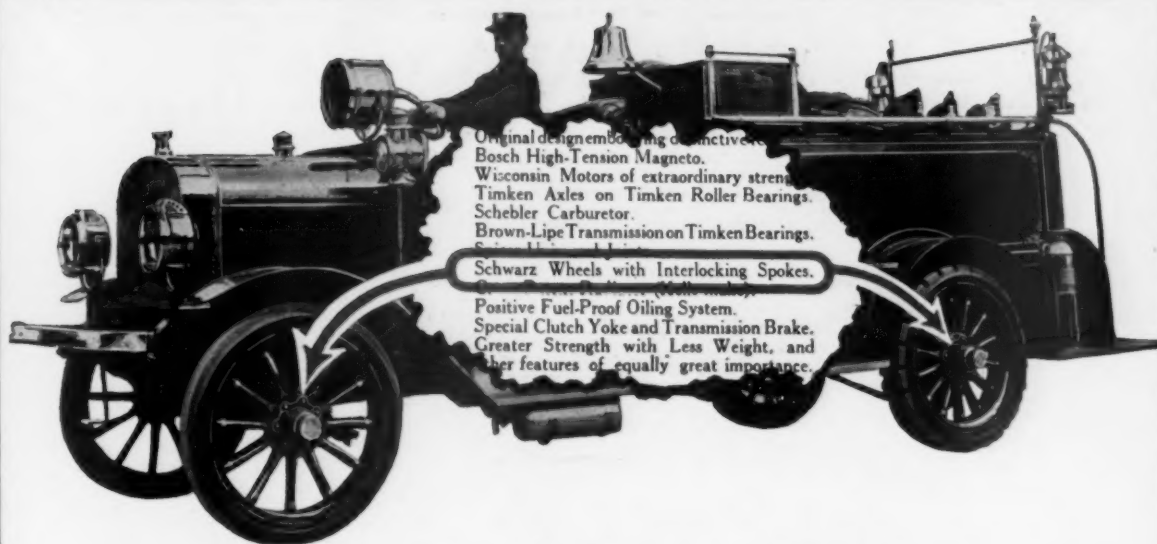
with driver's seat
and standard equipment

Chassis \$1400



Open Express Job
with Canopy Top

SIGNAL MOTOR TRUCK COMPANY
DETROIT, U. S. A.



Proud of the Make

It is almost impossible to find in truck and automobile specifications any wheels mentioned by name other than

SCHWARZ WHEELS

The reason is not hard to find. Everybody appreciates the best, and since Schwarz Wheels are universally recognized as being the best, the makers who use them in their product are proud of the make and insert the name in their specifications because they recognize it is a selling asset of great value.

This pre-eminence in the field of wheels, which has made the name Schwarz symbolical of the highest quality, has been attained only after the most severe tests and hard usage proved that the distinctive Schwarz method of construction afforded greater strength, safety and economy than any other type.

This being conclusively proven to automobile and truck designers, engineers and makers, it was but natural that all those making a quality product should incorporate Schwarz Wheels in them. Being proud of the make, they specified Schwarz Wheels by name, so that the buyers might know they were getting the utmost in wheel efficiency and value.

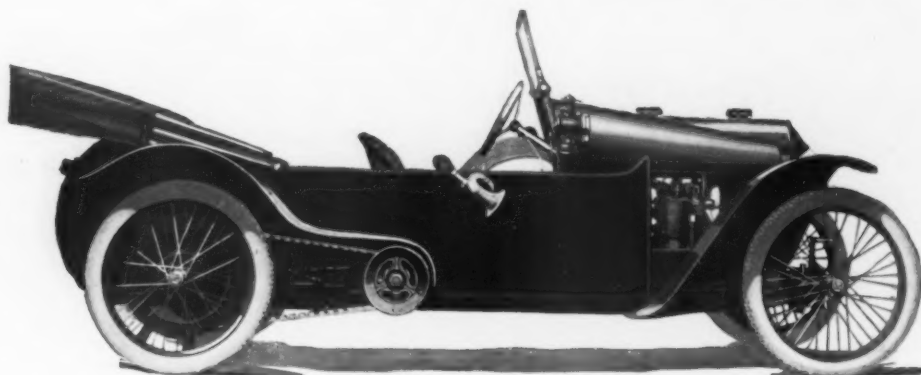
If your product does not have Schwarz Wheels it is time you ceased letting your competitors have an advantage by pointing to the fact that their product is Schwarz equipped while yours is not.

Send to-day for "Bear the Burden"—it will interest you.

The Schwarz Wheel Company

Frankford, Philadelphia, Pennsylvania

"BOWER SAVES POWER"



In the Lightest Pleasure Vehicles
"Bower Saves Power"
 In the Heaviest Commercial Cars



Notice: *The Bower Roller Bearing is patented in the United States and foreign countries. INFRINGERS of our patent right to MAKE, VEND or SELL will be duly prosecuted.*

BOWER ROLLER BEARING COMPANY
 Detroit, Michigan

When Writing, Please Say—"Saw Your Ad. in the C C J"



WHY
EXPERIMENT
WITH
EXPERIMENTERS?

Cleveland Worm Gears

ARE BEST
BY TEST

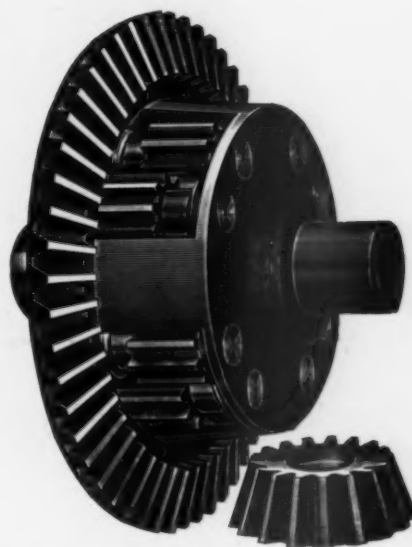
Cleveland
Worm & Gear Co.
Cleveland, Ohio



CULLMAN SPROCKETS and Differentials

in stock and to
order.

Send for catalog
and let us quote
you on your re-
quirements.



CULLMAN WHEEL COMPANY, CHICAGO
1351 GREENWOOD TERRACE

When Writing, Please Say—"Saw Your Ad. in the C C J"

THE DEALERS' TIME SAVER



Don't waste your time simply reading this ad.

The agency of the *Light Commercial Car* means a saving of time in making sales.

The *Light Commercial Car* is the result of ten years of actual experience in the package delivery business.

The *Light Commercial Car* is a quick seller at \$475.00. It weighs 600 pounds, carries a weight of 800 pounds, makes 40 miles on one gallon of gasoline, and is the swiftest delivery car on the market. The pre-eminent fact is established that the purpose for which this car is designed has been attained, and attained in a definite and unmistakable manner.

If you have read this ad, you will know what to do next.

**Wayne
Light Commercial Car
Company, Inc.**

1790 Broadway :: New York



Gould Storage Battery Gould

A PROMINENT packing company in Buffalo put a new 3½-ton electric truck into service in June, 1913, and specified a Gould Battery for motive power. This truck, in mornings alone, does work which formerly required one two-horse and two one-horse teams all day. Then, in the afternoon, the truck does the freight work which formerly required another two-horse team.

In regular service this truck covers about 55 miles per battery charge, the cost for charging current at Buffalo's new rate being less than one cent per mile. Did you ever hear of such economical delivery?

On a recent trip, full load was carried around Eden Valley, over one of the worst hills in western New York, and over four miles of sandy road, making a total of 52 miles.

After 6,000 miles of hard work, during which the truck frequently carried from ½ ton to 1 ton overload, the battery plates were to all appearances as good as new and the truck had missed only one day of service—that due to disarrangement of the charging system.

This packing company has now equipped all of its 2-ton trucks with Gould Batteries.

Gould Batteries would show you the way to the same kind of service. Tell us your requirements so we can quote. Gould renewals fit jars of any make.

Ask for booklet "What Gould Vehicle Batteries Are Doing."

Gould Storage Battery Co.

General Offices: 30 East 42nd Street, New York City

Boston, 14-16 Cambria Street Detroit, 88 East Congress Street
Philadelphia, 613 Betz Bldg. Chicago, The Rookery
Cleveland, 1761-5 East 18th Street San Francisco, 1440 Van Ness Ave.
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 PITTSBURGH KANSAS CITY SEATTLE

Canadian Representative: R. E. T. PRINGLE
Toronto Montreal Winnipeg Vancouver

Full stock carried in all cities where we have offices or agents

108



Five-Ton Electric Truck, equipped with 44 cells, type MV-19, "Ironclad-Exide" Battery

Here's what the Owner says about this Truck and its Battery:

"This is the truck which has been in constant operation on the streets of Grand Rapids for the past eight years. The present set of "Ironclad-Exide" batteries has given us so far better than 26,000 miles and are in good condition at the present time, and we anticipate will continue their good work for at least another year."

THE ELECTRIC STORAGE BATTERY CO.

Manufacturer of

The "Exide," "Hycap-Exide," "Tbin-Exide," and "Ironclad-Exide" Batteries.
 New York Boston Chicago PHILADELPHIA, PA. Denver San Francisco Seattle
 St. Louis Cleveland Atlanta Detroit 1888-1914 Rochester Los Angeles Portland, Ore.
 Toronto 886 "Exide" Distributors 9 "Exide" Depots "Exide" Inspection Corps

Veeder

HUB ODOMETER

The Model K illustrated herewith is the friend and faithful assistant of every truck owner who desires to keep accurate cost sheets and to know the precise mileage of each of his trucks.

This model is designed and built to withstand vibration and to faithfully and accurately perform its duties regardless of the terrific shocks, jolts and jars to which trucks are constantly subjected.

It is a compact, rugged, durable instrument in which no springs are used and whose constant wearing parts are made of hardened



steel. The dials and interlocking gears are made of brass or bronze, the dial figures porcelain enamel.

The Veeder registers forward, regardless of whether the car runs backward or forward; it can't be disconnected or made to falsify or to give anything but a true record of what the truck has done.

Every truck owner needs the Veeder in the interest of economical operation and the proper mileage from his trucks. Write us for detailed information about Form K.

PRICE, \$20

The Veeder Manufacturing Company

10 SARGEANT ST., HARTFORD, CONN.

Makers of Cyclometers, Odometers, Tachometers, Tachodometers, Counters and Small Die Castings
 T. H. CRANSTON & CO.
 56 E. Randolph St., Chicago

BERNARD I. BILL
 543 Golden Gate Ave., San Francisco, Cal.

There Is Good Territory Open
for the Sale of

CROCE MOTOR TRUCKS



¾, 1, 2 and 3 Ton Trucks

Dealers who are desirous of handling a high-class truck of proved ability that justifies strong arguments, gives complete satisfaction and builds up a business, are invited to investigate the CROCE. It will be found to excel in these very essential factors—quality, economy, efficiency, durability and value.

Consider these points for a moment:

QUALITY—that is proved by the parts used, such as Timken Axles, Wisconsin Motors, Spicer Universal Joints, Schwarz Wheels, Kells Radiator, Bosch Magneto, Brown-Lipe Transmission, Schebler Carburetor, and other equally high-class parts.

ECONOMY—The CROCE distinctive design causes the weight to be one-fourth less than other trucks of similar capacity. This saves enormously on tires and gasoline and makes operation very economical.

EFFICIENCY—In every line of business in which it has been used it has made good. The best proof of this is the fact that we get repeat orders from nearly every customer.

DURABILITY—The CROCE is built so well that it gives long-continued and satisfactory service. The first CROCE built is still in active service after years of usage. The construction is such that every buyer has the right to expect a similar record.

VALUE—There is full value for every dollar in CROCE trucks, and in the long run they are much cheaper than those whose first cost is less.

If these qualities appeal to you as being what you and your trade want, write us for complete descriptions, territory, terms, etc.

CROCE AUTOMOBILE CO.
ASBURY PARK, N. J.

"We have nothing but the highest words of praise for your product and have not failed at every opportunity to advertise that we are installing the Buda Motor in our machines."

BUDA MOTOR

"The Part that Sells the Truck"

likes to receive, and does receive many letters like the one from which this is an extract. The letter was from the manufacturer of a very remarkable machine. We will give you the name if you ask it.

THE BUDA COMPANY

FACTORY, HARVEY, ILL., (Chicago Suburb)

Address all correspondence to our **FACTORY REPRESENTATIVES**

BRANDENBURG & COMPANY

1108 S. MICHIGAN AVE. 57TH & BROADWAY FORD BUILDING
CHICAGO NEW YORK DETROIT



IF
Your Motor Truck
Is Equipped With a
Pyrene
FIRE EXTINGUISHER

**You Can Secure
15% Reduction
In Your Fire Insurance Premiums**

Should the premium amount to \$50, this saving will pay for Pyrene the first year. Of course, the reduced rate applies **each** year while the original Pyrene is good until used. It makes no difference whether your trucks are gasoline or electric, if they but carry Pyrene. Pyrene protects the load as well as the truck. Ask your supply dealer, or write our nearest branch. And when adding to your present fleet, be sure to specify Pyrene.

The Aetna Accident and Liability Co. and the Automobile Insurance Co. of Hartford, Conn., allow this reduction. See their agents or consult your own broker.

At all first-class auto supply dealers. Send postal to nearest branch for booklet—proving the service and true economy this scientific fire fighter brings to you.

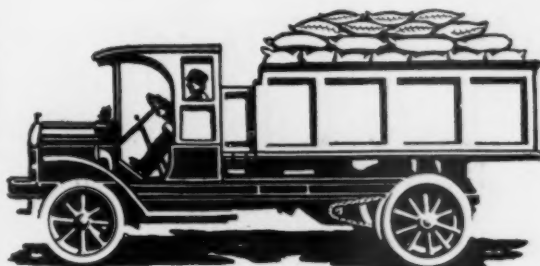
Brass and Nickel-Plated Pyrene Fire Extinguishers are the only one-quart Fire extinguishers included in the lists of approved Fire appliances issued by the National Board of Fire Underwriters.

Pyrene Manufacturing Co., 1358 Broadway, New York

Aberdeen, S. D.	Boston	Cleveland	Louisville	Pittsburgh
Alton	Buffalo	Dayton	Memphis	Richmond
Anderson, S. C.	Charlotte, N. C.	Denver	Milwaukee	St. Louis
Atlanta	Charleston	Detroit	New Orleans	St. Paul
Baltimore	W. Va.	Duluth	Oklahoma City	Salt Lake City
Birmingham	Chicago	Fargo, N. D.	Phoenix	San Antonio
Bridgeport	Cincinnati	Jacksonville	Philadelphia	York, Neb.

Pacific Coast Distributors: Gorham Fire Apparatus Co.
San Francisco Los Angeles Seattle

Distributors for Great Britain and the Continent:
The Pyrene Co., Ltd., 19-21 Great Queen Street, London, W. C.



The Brake **MUST** Work

When the big truck with its heavy load must be stopped, the brakes must work. And **that** depends on the brake lining. It must **GRIP clear through**; it must stand hard service; it must have "wearing life" as does

Thermoid HYDRAULIC COMPRESSED Brake Lining-100%

Thermoid remains reliable even until worn paper thin. Hydraulic compression is the reason Thermoid retains its uniform gripping power. It explains why its density is fixed. Why it cannot be burned out—nor affected by oil, water, gasoline, dirt.

Thermoid represents 60% more labor and contains 50% more material, size for size, than the ordinary.

Our Guarantee

Thermoid will
make good—or
we will.



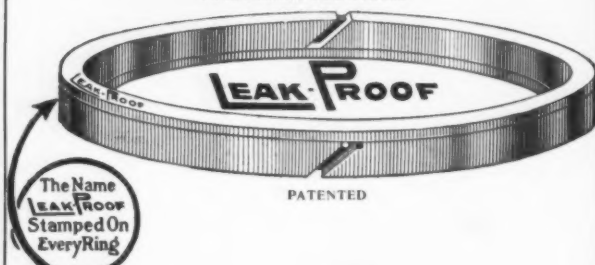
THERMOID RUBBER COMPANY
TRENTON, NEW JERSEY

Make Your Trucks More Profitable

BY EQUIPPING THEIR MOTORS WITH

LEAK-PROOF

TRADE-MARK REGISTERED



Piston Rings

They effectually prevent the escape of gas from the combustion chamber, thus producing perfect combustion. This means getting full power and a consequent saving of gasoline in traveling any given distance.

The same principle of construction which does this also prevents oil from working up past the piston rings and forming carbon in the combustion chamber. This cuts down the working capacity of the motor and runs up expense bills. **LEAK-PROOF** Rings, by stopping this, enable you to save at both ends, getting more service for less money.

To achieve this desirable result, it is necessary that you get the genuine **LEAK-PROOF** Piston Rings. Their success has been so phenomenal that other makers are introducing split piston rings, claiming they are leak-proof and seeking to thrive upon the reputation of the original **LEAK-PROOF** Rings.

The **LEAK-PROOF** principle is the only sound and correct way to secure the desired results, and it behooves you to make sure that you are getting the rings you ask for. To make it easy to identify them the word **LEAK-PROOF** is now stamped on every ring, as shown in the illustration. If you do not see that—reject the rings, for they are not the power savers you seek.

McQuay-Norris Mfg. Co.
DEPT. C.

St. Louis, Missouri

BRANCH OFFICES:

NEW YORK, N. Y., 1919 Broadway
CHICAGO, ILL., 718-719 Michigan
Bldg., Michigan Bldg. and
Washington St.
SAN FRANCISCO, CAL., 268 Mar-
ket St.

PITTSBURGH, PA., 7620 Tioga St.
KANSAS CITY, MO., 813 New Nel-
son Bldg.
LOS ANGELES, CAL., 224 Central
Bldg., 6th and Main Sts.
CANADA, W. H. Barnfield & Sons,
120 Adelaide St., W., Toronto.

THE COMMERCIAL CAR JOURNAL

is the logical paper for every man to read who contemplates buying or selling commercial motor cars.

It is brimful of essential information.

The Commercial Car Owner will also find many suggestions in it that will make his driving more efficient.

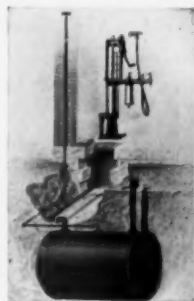
*Send for a
sample copy*

Commercial Car Journal
Market & 49th Sts., Philadelphia, Pa.



A Bowser Keeps It Going

No delays due to poor fuel when the gasoline is stored in a Bowser Underground Outfit. The Bowser way adds to the efficiency—utility—of the Commercial Truck. Protects the gasoline against evaporation, explosions, leakage, seepage, mishandling or theft. Good, clean, full-bodied gasoline pumped any distance—right into the truck. None lost or wasted on the way.



BOWSER Gasoline and Oil Storage Systems

More than this a Bowser gasoline outfit or lubricating oil unit delivers the oil in predetermined quantities. No carelessness. No "mistakes". No oil unaccounted for.

The System for You A Bowser System pays for itself in oil saved and added car efficiency. For particulars of the Bowser system for your garage, send a postal today. Write now.

S. F. Bowser & Co., Inc.

28121 Thomas Street, Fort Wayne, Indiana
Canadian Factory, Toronto, Ontario



A New England Expressman's Profitable Chase Equipment

"Hard Buyers" Can't Dodge Your "Come-Back"

YOU back every claim with facts—cold facts, figures, photos, signatures—in putting over a Chase sale.

It isn't *your* word—it's the word and the actual experience of owners of Chase Trucks that are in active operation even while your "prospect" is reading the owners' signed statements. 3660 Chase Trucks already sold to hard buyers.

This is the easy way to sell. It's the only safe way. It is making money today for dealers in every portion of the country.

Five up-to-the-minute Chase models—from 1000 lb. delivery car, list \$750, up to 3-ton truck, list \$3300. We have some interesting territory not yet closed. Write us about it today. Address Dept. 20.

CHASE MOTOR TRUCK CO., SYRACUSE, N.Y.

BUILDERS OF

CHASE MOTOR TRUCKS

Adams Trucks "Deliver the Goods"

Greater Values With a Lower
Price—One-Ton Chassis

\$1850

That the price is lower you will see at a glance.

The increased values are just as easily recognized.

To the thoroughness of Adams' construction, and its marked simplicity of every detail affecting its control and maintenance, we have added these important features:

Continental Motors are now used exclusively on all Adams Models.

Timken Axles and Bearings are used throughout.

Bodies are built, of course, for any trade, on 1, 1½ or 2 ton chassis. Adams Trucks are standardized for more than one hundred different lines of business.

We want to hear from wide-awake dealers in unoccupied territory. Write today.

THE ADAMS BROS. COMPANY

438 West Main Cross :: Findlay, Ohio

First American Truck Manufacturers to use the French type of hood; with radiator at rear of motor. Bodies made in all styles, to suit any industry.

CANDLER

"Safety First" is the watchword of successful Motor Truck designers.

An efficient cooling system plays an important part in modern Truck design.

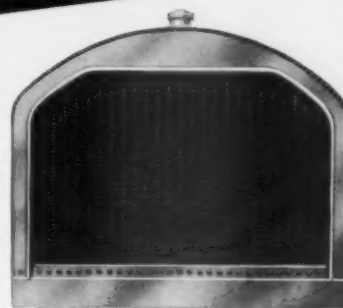
A Radiator that cools under extreme conditions and gives constant service is surely essential.

CANDLER Radiators are particularly adapted to Commercial Vehicles. Their design, construction and ease of repair affords the maximum of strength and efficiency. Added to this is a completely equipped factory, and men with over ten years' experience in the development of successful radiators.

CANDLER Special Radiators are worthy of your serious consideration. Their remarkable performance aids largely in keeping the Truck "Always on the Job."

An opportunity to demonstrate our claims is all we ask. May we have it?

CANDLER RADIATOR CO., DETROIT
"SAFETY FIRST" Radiators



RADIATORS

SIXTY-TWO different manufacturers are now specifying LONG cooling systems.

We have been able to furnish them with exactly the system they wanted and needed.

Our modern factory with its efficient crimping, punching, bending and stamping machinery makes our product uniformly good.

We make all kinds of cooling systems—cellular, honeycomb, spiral tube types, for all kinds of cars, trucks and tractors.

Also hoods, radiators and accessory fittings.

We guarantee to solve your cooling problems.

Let our Engineering Department help you.

Long Manufacturing Co.
Detroit Michigan



LONG



The Car that Proved a Real Solution of Delivery Problems

Price, \$635—Capacity, 1000 lbs.

A real commercial car—strong, rugged, durable—of oversize parts and high quality, at a price which makes it available for merchants of every character. Scores of dealers are finding it the money maker of their careers—it may be such for you. Write for information.

The Touraine Co., Philadelphia, Pa.

Plant
where
Vim
Cars
are
made



Capacity
doubled
to meet
demand
of 60
days

DeKalb TRUCKS

Some Good Territory Still Open for Dealers

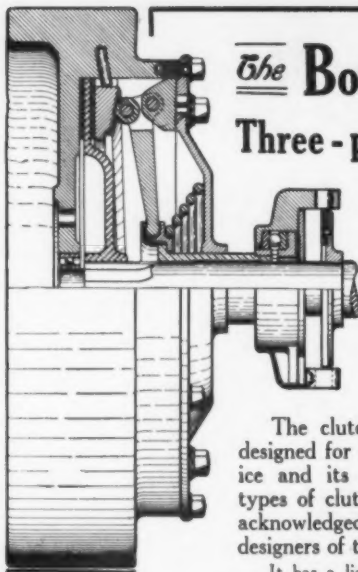
Dealers desirous of handling a high-class truck, correctly designed, substantially built, and capable of giving highly efficient and economical service, should investigate the DeKalb. It will stand the most exacting tests and prove itself a truck with which you can make money.

These brief specifications tell the story of DeKalb quality:

Timken Axles	Three-Point Suspension
Continental Motor	Selective Sliding-Gear
Bosch Magneto	Transmission
Stromberg Carburetor	Non-Reversible Worm-
Left Drive	Gear Steering Gear
Center Control	Special Type Cone Clutch
Pressed-Steel Frame	Two Ton Capacity

Our selling organization is being completed, but some good locations are still open. If interested, write for our plan.

DeKalb Wagon Co., DeKalb, Ill.



The **Borg & Beck**
Three-plate dry disc
Clutch
offers a real
solution of
the clutch
problem

The clutch has been especially designed for truck and tractor service and its superiority over other types of clutch now in use is freely acknowledged by engineers and designers of the highest standing.

It has a light friction disc that will not manifest any drag in releasing. Its engagement is gradual and positive, and it will not grab, stutter or slip. Does away with gear shifting in crowded traffic by means of friction-slippage. Can be slipped indefinitely without damage.

Truck, tractor and automobile makers are invited to write for complete description.

The Borg & Beck Co.
Moline, Ill.



Seldens Are Built for Economy

Write us what business you are in and we will refer you to a user in the same line who has found that

THE SELDEN TRUCK

has proven economical for him to use. He will tell you that the "Selden" is not only economical to maintain, but that, because of the great strength built into the parts which bear the strain of road work, the "Selden" is always ready to carry its load under every road and weather condition.

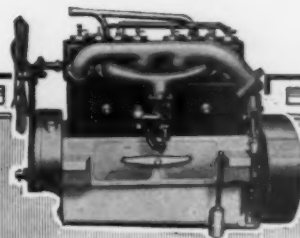
\$500 Puts the \$2000 Selden Truck Into Service

and the balance of the purchase price is payable at the rate of \$125 per month. Dealers find that this Selden Sales Plan enables them to increase their sales, because they can offer to put the truck at work for a small initial outlay and the truck itself will earn the remaining payments.

It will pay any dealer in unoccupied territory to investigate this proposition. Write us today.

SELDEN TRUCK SALES CO.

406 East Avenue
Rochester, N. Y.



WAUKESHA

4 1/4 x 6 3/4 LONG STROKE TRUCK MOTOR

EFFICIENCY is the Waukesha Motor's best eulogy. It is efficient because it is constructed to give the utmost in service.

The Waukesha crankshaft has a tensile strength of 70 tons. The bearings have three times the wearing quality of ordinary bearings. Both these metals are our own processes. The rest of the motor is on par with these two features. When we can prove all this, why not ask us to?

Why not learn that you can put a motor in your trucks that will exceed your broadest guarantee of efficiency, wear and economy of fuel? Your request will bring proof that will leave no doubt of the Waukesha Long-Stroke Motor's supremacy.

WAUKESHA MOTOR CO.
WAUKESHA Dept. A. WISCONSIN

AN EXCEPTIONAL MOTOR

ROSS STEERING and DIFFERENTIAL GEARS

**are standard on good
motor truck
construction**

WRITE FOR CATALOG

ROSS GEAR & TOOL CO.

790 Heath St.

::

Lafayette, Ind.

We Can Build as Good a Body as The Highland

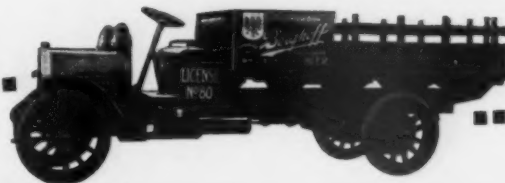
The above is an expression often heard by purchasers of Motor Truck bodies. In a great many instances it is no doubt true, but can they do it as quickly and as economically as we, who make it a specialty, and have equipped our shops with machinery especially for manufacturing the Highland Standard Bodies?

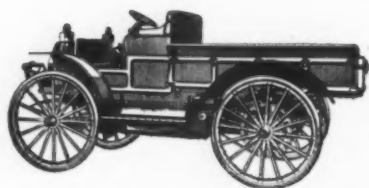
We standardize the design, manufacture in quantities and give the purchaser the benefit of the saving.

You should have our catalog and price-list with you always.

The Highland Body Mfg. Co.

Cincinnati, Ohio





Will It Do Our Work?

"We want motor trucks that will do our work. Will yours do it?"

Beyond question the International Motor Truck is a "work" truck. With loads up to its rated capacity of one-half ton, in all kinds of quick delivery and light hauling work, it has made good in more than a hundred different lines of business. The record of the

International Motor Truck

covering eight years of growing success, is the best possible guarantee of its efficiency and economy.

In all probability, this truck is the answer to your delivery and hauling problems. Give it a chance to prove its worth and its value to you. Full information and interesting literature are yours for the asking. Address a card or letter to

International Harvester Company of America
(Incorporated)
182 Harvester Building CHICAGO U S A



SPLITDORF MAGNETOS—low and high tension—are made in a wide range of models for all manner of work and they'll give your motor more power—make your motor run smoother and quieter than will any other make, and, equipped with one, you can always start your engine on a quarter turn.

We'll exchange your present magneto of any make on a liberal allowance basis for an up-to-the-minute **SPLITDORF** low or high tension.

SPLITDORF PLUGS are not experimental—they are standard. Known since their first appearance as the "common sense plug" they are exactly that—no more and no less. **SPLITDORF PLUGS** will outlast your motor—thousands are rarely removed from a cylinder head. There is nothing fanciful about them—they are made to endure any and every strain of ignition put upon them.

SPLITDORF ELECTRICAL COMPANY
98 Warren Street :: NEWARK, N. J.

HINDLEY Worm-Gear Axle



The drive that makes a truck really efficient and profitable

The embodiment of this drive in a truck assures longer service, greater efficiency, less expense, lower operating cost.

This is not merely theory, but facts proved by experience. So firmly established have become the advantages of the Hindley Worm-Gear Axle that its presence in a truck is both an assurance of its worth and an argument for its sale.

It is to your interest to inquire about this drive for the trucks you build. The services of our engineering department are at your command.

HINDLEY GEAR COMPANY
1105 Frankford Avenue Philadelphia



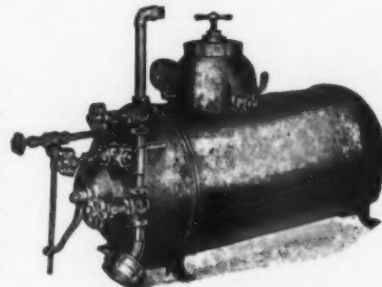
3-Gallon
Approved
Extinguisher

Chemical Fire Apparatus

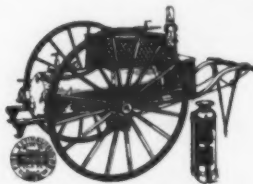
HAND EXTINGUISHERS and TANKS

of every description for department apparatus. We are equipped to make tanks of any size or type.

We also provide a complete line of Chemical Engines, mounted on wheels for service in factories, towns, villages, etc. Hose Reels, Hose Axles, Ladders, Hooks, etc.



35-Gallon Copper Tank



We can equip any chassis complete with body, chemical apparatus, etc. **Ask us.**

O. J. CHILDS CO.

48 Liberty Street
UTICA, N. Y.

Lippard-Stewart

WORM-DRIVE TRUCKS

Worm drive is now the accepted standard for truck use. Cumbersome and troublesome jack shaft and chains are back numbers. This type of axle is now used on all Lippard-Stewart models. Solid tires, front and rear, are regularly specified in connection with worm drive—the axle is especially built for use with this equipment.

Model G, 2 Tons Capacity	.....\$2600 Chassis
Model F, 1½ Tons Capacity	.....\$2300 Chassis
Model N, 1 Ton Capacity	.....\$2000 Chassis
Model B (Bevel Drive) 1500 Lbs. Capacity, (Worm Drive)	\$1650 Chassis \$100 Extra

The manner in which the Lippard-Stewart meets users' requirements makes the line an active selling proposition. If you are interested in the dealership for your territory, write to us immediately.

Lippard-Stewart Motor Car Co.

1737 Elmwood Avenue, Buffalo, N. Y.

A Strong Plug for Heavy Work



You can't expect a brittle Spark Plug to stand the strain and jars of your motor truck. Plugs insulated with porcelain, mica, etc. are bound to break.

HERZ PLUG

"Bougie Mercedes"

is an exquisite combination of STONE and STEEL. It is made to stand up, and it does. Its insulation is

Double Unbreakable Stone

It is Blue Enameled. HERZ PLUG has Four Sparking Points of Platinum-Alloy, which ensure a fat, hot spark at all times. It is Self-Cleaning and

Guaranteed a Full Year

HERZ & CO., 245 W. 55th St., New York

Makers of the HERZ MAGNETO



PLAIN COMPRESSION
(Patented)

Empress

BRASS AND STEEL

GREASE AND OIL CUPS

WE MANUFACTURE a full line of Plain, Leather Packed, Ratchet, Marine, Spring Compression, and many other styles of Grease Cups.

Our line of Oil Cups is equally satisfactory and complete.

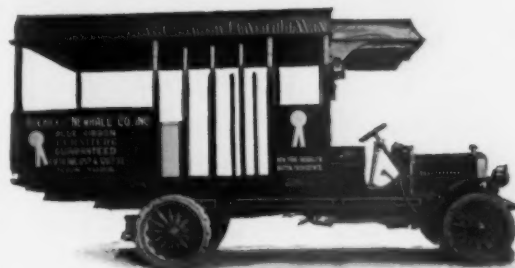
Catalogue on Application

Bowen Manufacturing Co.
AUBURN, N. Y.



SPECIAL SPRING
COMPRESSION
(Patented)

ROWE MOTOR TRUCKS



are used in every line of business and in every case have proved the most economical means of hauling.

A Rowe Truck will save you money in transporting your merchandise.

The Rowe Truck is guaranteed to give

Continuous Economical Operation

Worm or chain drive. One to five ton capacity

Rowe Motor Manufacturing Co.
Downingtown, Pa.

Which Truck Is Best of the Famous Big Four?

Experienced buyers of motor trucks now choose between four great makes. Each of the four is backed by millions. All are in the business to stay. Among them competition is keen. Almost daily, keenly competitive tests between these four great makes of trucks are establishing which is the best. For all are in use by the largest corporations—who use trucks by the dozen.

In pulling power the Velie Truck, the only one of the big four unadvertised until now, proves that a more powerful, slower running motor will in competitive tests out-pull and out-wear all high-speed, small-powered motors.

In three-ton trucks all four makes have 5 or 6 inch frames—channel shaped, or I-beam. But the Velie in addition to having a 6-inch I-beam frame has a 4-inch sub-frame. And in heavy hauling this extra sub-frame proves its wonderful worth.

Experienced buyers can tell by comparison of specifications why it is that the Velie is winning the fiercely competitive tests between the four best makes of trucks.

Any Velie agent has these truck contest results on file—they are convincing—ask to see them.



Velie

Velie Motor Vehicle Company - Moline, Ill.

THE RUTENBER MOTOR

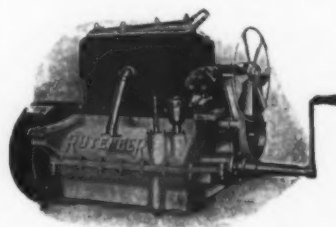
Manufactured since 1901 for high-grade

Automobiles and Trucks

3½ x 5¼ four and six cylinder

4¼ x 5¼ four cylinder standard or unit and

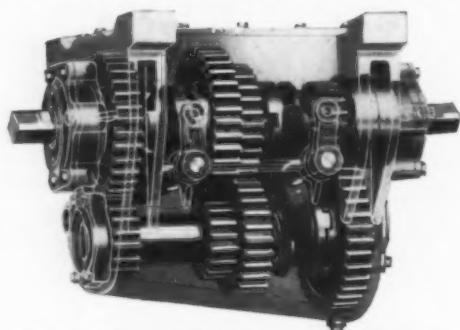
4 x 4 and 4½ x 5½ standard types, all L-head, 4-cycle.



Manufacturers are invited to investigate our service and our facilities. Literature on request.

The Rutember Motor Company
MARION, INDIANA

COTTA TRANSMISSIONS



Internal View of Shaft-Drive Transmission, designed for use in worm-drive trucks

For Heavy Truck and Tractor Service Eliminate Transmission Trouble

Selective type, individual clutch system. All gears always in mesh. Countershaft and mainshaft gears idle on direct. Improved speed-changing device. No plain bearings—loose gears mounted on roller bearings.

Write for Bulletin

COTTA TRANSMISSION CO.
814 So. Main Street Rockford, Illinois



The Cost of Keeping the Truck Going

is a point that is, at least, worthy of careful consideration.

First cost isn't all there is to truck operation.

It's the later cost that is really the big item. And to keep this low is the reason that we build

B. A. Grammm's Trucks

as we do.

Self-starter, individual clutch transmission, guaranteed springs, all do their part.

And the records of the trucks in service, the owners' own statements on this subject, are the conclusive proof that we have succeeded in keeping this cost to the minimum.

We will send you some of this interesting evidence along your line, if you'll ask for it.

THE GRAMM-BERNSTEIN COMPANY
Dept. 1 LIMA, OHIO

HESS-BRIGHT Ball Bearings

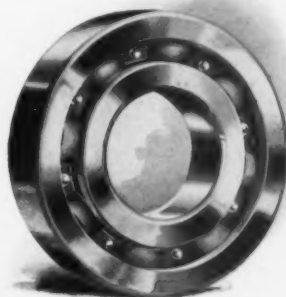
Service stations in all parts of the United States enable users of Hess-Bright Ball Bearings to procure duplicates, have repairs made, or obtain anything desired from the Hess-Bright line with the minimum loss of time, trouble and expense.

Hess-Bright quality and Hess-Bright service are two powerful reasons why Hess-Bright Bearings should be used in your trucks.

**The
Hess-Bright
Mfg. Co.**

**Front Street and
Erie Avenue
Philadelphia, Pa.**

Stores for Retail Distribution
Philadelphia, 666 N. Broad
St.
New York, 1974 Broadway
Chicago, 1800 Michigan Ave.



Part of Fleet of 10 Stewarts in the Service of the Buffalo News

Stewart

Delivery Trucks

Write for this Book


"How Motor Delivery Pays" is not a catalog; it is a frank, free discussion of the question of motor delivery as applied to different lines of business.

It tells how to judge motor truck quality; how to pick the right size truck for every business.

Send for our catalog. But above all, send for our book, "How Motor Delivery Pays." Send today.

Stewart Motor Corporation, Buffalo, N.Y.

T. R. Lippard, Pres. and Gen'l Mgr. R. O. Stewart, Vice-Pres. and Chf. Eng.
R. P. Lentz, Sec. and Treas.

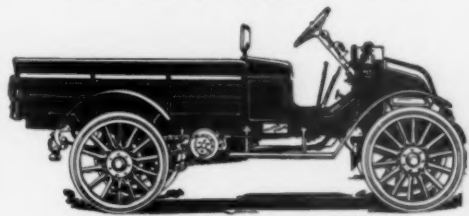


PALMER MOORE

**Efficiency and Economy
The Test of Truck Fitness**

20 Palmer-Moore Trucks

Just ordered by the Clearing House
Parcel Delivery Company of Boston



Open Express Body—Price, \$1425

The result of a competitive test to find the truck best suited to meet the exacting needs of parcel delivery work in Boston and 120 surrounding towns.

The Palmer-Moore demonstrates its superior fitness wherever tried. It satisfies every requirement in the light delivery field.

1600 lbs. Capacity. All Bodies

For further information, address Dept. C

Palmer-Moore Company Syracuse, N. Y.



GEARS

GEARS

**Bevels
Spurs**

**Mitres
Spirals
Sprockets**

**Worms
Racks**

We produce in quantities to specification cut and planed Gears and Pinions of all descriptions. As a source of supply in connection with *Gears and Gear Cutting*, we are considered an asset by many of the best interests. They buy from us year after year, because these advantages are afforded:

- (1) *Unexcelled facilities.*
- (2) *The highest standard of workmanship.*
- (3) *Years of experience as specialists in gearing.*
- (4) *A most careful selection of materials.*
- (5) *Particular attention to deliveries.*

THE VAN DORN & DUTTON CO.
Gear Specialists
CLEVELAND (61st City)

GEARS



GEARS



When Writing, Please Say—"Saw Your Ad. in the C C J"

3 Pierce-Arrow Trucks Haul 150 Tons of Ice a Day

The Standard Ice Manufacturing Company of Philadelphia operates three 5-Ton Pierce-Arrow Motor Trucks, each hauling 50 tons of ice per day on runs that average three miles out from the manufacturing plant to the distributing stations.

The J. M. Horton Ice Cream Company has obtained equally satisfactory results from its fleet of six Pierce-Arrows operating in the congested traffic of New York City.

Pierce-Arrows are carrying ice in Florida, in Massachusetts, in Missouri, in Illinois and many other parts of the country, and everywhere, under widely varied conditions of climate, traffic and routing, they have proved themselves the quickest, cleanest, most economical and satisfactory means of hauling and delivering ice.

Pierce-Arrow Motor Trucks are manufactured in two capacities, 5-Ton and 2-Ton.

A request on your letterhead will bring an illustrated book giving full information on Pierce-Arrow Trucks.

PIERCE-ARROW MOTOR CAR CO.
BUFFALO, N. Y.

Hayes Wheels

Our motor truck department is equipped with the latest improved and specially designed machinery, and with an experienced, capable organization, to turn out the best wheels ever made for motor trucks.

Hayes quality is known from ocean to ocean. Hayes Wheels are used, among others, by these leading automobile and truck manufacturers:

Studebaker	Standard Motor Truck
Detroit Electric	Federal
Garford	Speedwell
Imperial	Cadillac
General Motors Truck	Sandow
Brown Commercial Car	Gramm
Chalmers	Woods
Columbia	Moon
Maxwell	Regal
Rambler	Packard
Overland	Mogul
Jackson	Elkhart

SUBMIT YOUR SPECIFICATIONS
TO US FOR QUOTATIONS

HAYES WHEEL CO. :: Jackson, Mich.

The Lavigne Gear Co.

Pioneer
Truck Steering Gear
Manufacturers

FOR

Trucks, Pleasure Cars and Tractors

WE FURNISH OUR GEARS WITH DRAG LINKS
WRITE FOR BLUE PRINTS

RACINE, WISCONSIN

Accurate Information

about makers of automobiles,
their parts, accessories, tires,
shop and factory equipment

All of this—telling the buyer what he wants to know when he wants to know it—is but one of the features of the

CHILTON AUTOMOBILE DIRECTORY

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Known to Motor Car Practice

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1 Ton—1½ Ton—2½ Ton

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Milwaukee, Wis., U. S. A.
Factories: North Milwaukee, Wis.

Motor Truck Bands

MADE WITHIN THE FOLLOWING

Dimensional Tolerances

(ADOPTED BY THE SOCIETY OF AUTOMOBILE ENG.)

1.—Tolerance in circumference of felloe band:

	Plus	Minus
Before application to wheel - -	1-32"	1-32"
After " " " " - -	1-16"	1-32"

Variation from precise measurement shall be uniform over entire width of band.

2.—Tolerance in width of felloe band:

	Plus	Minus
Up to and including 4" - - -	1-32"	1-32"
4—1-16" to 6" - - -	3-64"	3-64"
6—1-16" to 12" - - -	1-16"	1-16"

3.—Variation in trueness of band when placed on surface plate: Band shall touch at all points within 1-32" up to and including 6" width. Over 6" width within 1-16".

4.—Variation in thickness of band: .006" plus or minus.

5.—Trueness to round. The radial tolerance on the wheel when felloe band is applied shall be 1-16" plus or minus. This plus or minus tolerance must not occur at diametrically opposite points. There shall be no flat spots or kinks in felloe band on the finished wheel.

The Standard Welding Company

CLEVELAND

NEW YORK

CHICAGO

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Worcester Presteel

Rear Axle
Housings
Ball Cups
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Capacity (Exclusive of Driver), 500 lbs.
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Republic Mileage

To get mileage you must have quality tires and that is the only kind we make. Of course they cost a little more. That is because they contain the best materials and are the product of the highest skilled workmanship.

One Republic Tire Sells Another

and the man who uses Republics will take pleasure in telling you why. The Republic Staggard Tread is the original non-skid tire just as it is the most effective. Look at the Staggard's patent dates—Sept. 15-22, 1908.

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BUCKEYE Motor Truck Jacks

Buckeye Motor Truck Jacks are safe, reliable and made to stand the wear and tear for which they are intended. They are fully guaranteed, and cannot possibly drop with a load. They are made from Steel Drop Forgings, best finish and workmanship throughout.

Get our prices before you place your orders for jacks, we can save you money.

No.	Height Bar Down	Raise of Bar	Height Bar Up	Weight	Capacity	with formed handle	List Price
7	11 $\frac{1}{4}$ "	6 $\frac{1}{2}$ "	18"	16 lbs.	2 $\frac{1}{2}$ tons		\$10.00
13	14 $\frac{1}{4}$ "	7 $\frac{1}{2}$ "	20 $\frac{1}{2}$ "	26 $\frac{1}{2}$ "	3 "		15.00
14	14 $\frac{1}{4}$ "	7 $\frac{1}{2}$ "	20 $\frac{1}{2}$ "	33 "	5 "		16.00
9	11 $\frac{1}{2}$ "	6"	17 $\frac{1}{2}$ "	10 "	1 $\frac{1}{2}$ "		6.00

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THE PARISH & BINGHAM CO.
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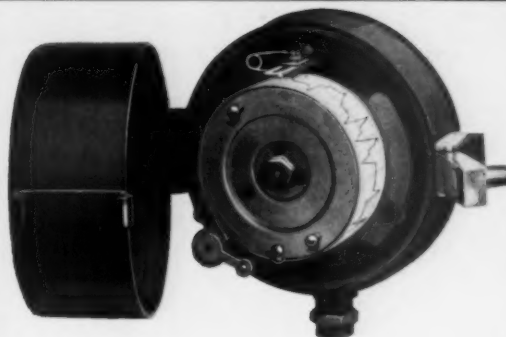
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Philadelphia, Pa.



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(shown above)

gives you the information you want—on paper, accurately, untampered with, every minute, for every truck. It keeps a record of

- (1) Time truck is moving
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These facts enable you to eliminate wasted time and inefficient drivers and get the most out of your trucks at the lowest cost.

The Recordograf is simple, small and sturdy, gives the information on a tape, easily read, and can be installed on any truck. Its cost is nothing compared to the saving it makes possible.

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(Hub Odometer, shown below)

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The "Dreadnaught" type is guaranteed indestructible. The "Applied" type is the only Hub Odometer that can be fitted to all trucks.

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The Linquist Auto-Matic Safety Fender & Brake



A simple, dependable and durable safety device that automatically **drops the Fender, puts on the brake, and stops the engine** on coming in contact with any object, thus preventing accidents and injuries, saving lives and money.

Every motorist should have this great device. Thousands of lives are sacrificed yearly on account of no safety device in use. Damage suits ranging from \$100 to \$15,000 are instituted against the unfortunate driver or car owner. Endorsed by Safety First Societies throughout the country.

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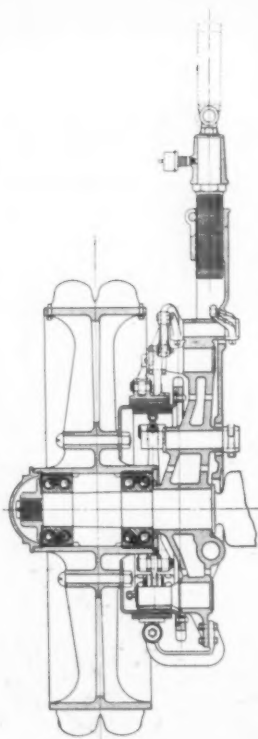
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This design of a chain drive rear wheel has been successfully used for several years in motor trucks on all load ratings up to ten tons. It is mounted on New Departure Double Row Ball Bearings. Actual, practical, everyday service has proved this bearing equipment to be superior.

Note the compactness of the bearing unit. It combines two bearings in one, carries a radial load equal to or greater than that sustained by any other bearing and resists all thrust stresses developed by the severest working conditions.

There is an advantage, also, in the fact that it is the ball type of bearing—more completely without friction and therefore consuming less power and requiring less gasoline—economical as well as efficient.

The New Departure is the original double row. The fact that it now has imitators argues for its merit.

The service of our engineering department is freely yours. Send blue print with data as to maximum and minimum loads and speeds and our corps of engineers will recommend the bearing sizes best adapted to your work.

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Crank Shafts
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These are the drop-forged automobile parts upon which our reputation for quality and service has been built.

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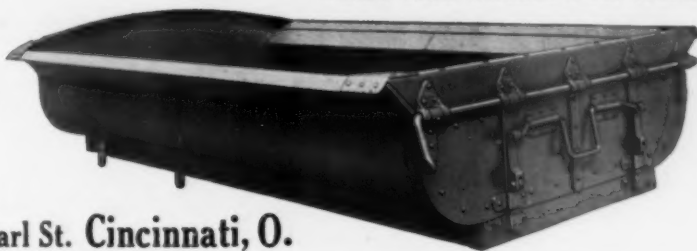
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is admirably adapted for carrying coal, sand, gravel, etc. We can design this body to suit your requirements and specifications.

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KOEHLER ONE TON TRUCK \$750

GREATEST VALUE—PRICE—LOWEST PRICE—CAPACITY

Here are brief specifications:
MOTOR, 24 h.p., water-cooled, 4-cylinder; **IGNITION**, high-tension magneto; **TIRES**, 36-inch, standard, removable; **TREAD**, 58 inches; **AXLES**, 2-inch square rear, 1½ inch front; **TRANSMISSION**, proved **RIGHT** by years of use. Gears, genuine chrome-nickel.

TEN BODY TYPES

KOEHLER \$750

ONE TON TRUCK

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The Dominating Truck of the One Ton Field

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This is a great money maker for dealers because it is the lowest priced ton truck in the market, the greatest value at any price, has the greatest adaptability to all lines of business, is simple in construction, and does its work in a highly efficient and economical manner. It makes money for the dealer because he can show any merchant that it will save money for him.

DEALERS This is opportunity time for you. Do not hesitate, doubt or delay, but send at once for our complete selling plan.

H. J. KOEHLER S. G. CO. 1710 Broadway, New York

KOEHLER ONE TON TRUCK \$750

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REASON

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Formerly of the
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Tuesday and Wednesday, July 21st and 22nd, 1914, at
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The sale of the R. C. H. Corporation includes Machine Tools, Engine Lathes, Drill Presses, Universal Milling Machines, Turret Lathes, Grinders, Gleason Gear Cutters, Screw Machines, Shapers, Hack Saws, four 2500-pound Drop Hammers, Trimming Presses, Electric Welding Machines, Shears and Annealing Furnaces; Bolting, an enormous supply of small tools such as twist drills, reamers, gauges, cutters, 400 tons of round, flat bar and forged iron and tool steel, etc. Machine tools and small tools both to be sold in separate lots only.

Also Trustee's Sale of
 Real Estate, Cars, Good Will, Drawings, Patterns,
 Repair Parts, etc., of the

HUPP-YEATS ELECTRIC CAR CO.
 DETROIT, MICH.

Wednesday, July 22nd, 1914, at 12 o'clock M., on the premises

The sale of the Hupp-Yeats Electric Car Co. will be in three parts: 1. the real estate; 2. the good will, repair parts and right to supply same, patterns, jigs, dies of the Hupp-Yeats Car Co. as a going concern; 3. nine Hupp-Yeats Electric Cars, each separately.

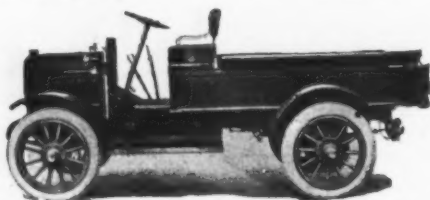
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LOOK!!**

Model "C"
 1600 to 2000 lbs. Capacity
 DOUBLE REDUCTION
 (7 to 1) REAR AXLE

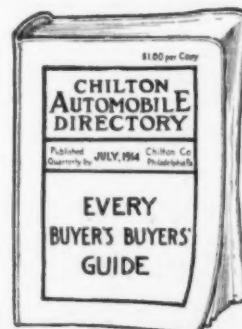


CHASSIS { 34" x 3" Front Solid Tires \$1285.00
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COMPLETE CAR, Painted and Trimmed, with Body,
 \$80.00 to \$175.00 additional, according to type of body

Flint Motor Wagon Department
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These eight points of BAKER superiority appeal to any user of motor trucks:

Double Brakes: Afford extra safety in controlling heavy loads on hills. Joints bronze bushed; shoes asbestos lined.

300% Overload Capacity Motor: Won't burn out. Extra wide driving chain runs with oil bath, in cast aluminum box.

Extra Equipment Included: Volt ammeter or ampere hour meter, hub or dash odometer, electric bell or horn, without charge.

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Springs Extra Tough: Will not break or crack; designed for 50% overload. Spring end and bracket bronze bushed.

Front and Rear Axles: Unusually strong tough steel drop forgings. Spring supports forged to axle.

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CLEVELAND



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Years of unequalled service to users of Covert Transmissions have proven the superiority of Covert construction.

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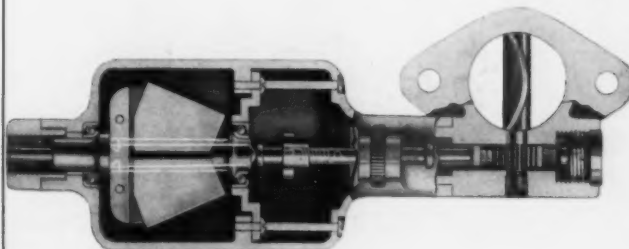
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IN USE BY THE

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BEYOND ANY QUESTION

and wholly within the bounds of demonstration Sheldon worm gear axles are the most efficient axles of this type known to the motor car industry.



In Sheldon axle construction this most important feature of the worm gear principle—efficiency—the carrying of the maximum of power to the rear wheels—is developed to the greatest degree.

This condition is brought about primarily through the fact that the worm is mounted upon two annular ball bearings with the thrust load taken care of by a separate self contained thrust ball bearing.

It is this particular feature of design that in greatest degree enables us to prove under actual test the unquestioned superior efficiency of the Sheldon worm gear axles. And let us say further that in the selection of ball bearings for both radial and thrust load carrying we have not acted arbitrarily. Ball bearings have been decided upon only after the severest and most exhaustive tests. We are frank to admit that foreign practice influenced us primarily in this regard. We noted that foreign manufacturers used ball bearings in their worm gear construction. Knowing that they had had by far the greatest experience with this type of axle we were naturally impressed by this fact. Subsequent tests have shown us conclusively that a worm gear axle can realize its full measure of efficiency only by the use of ball bearings for carrying both radial and thrust loads.

The explanation of this statement lies in the fact, first, that ball bearings are the most nearly non-friction of any type of bearing—secondly, that by virtue of their ability to carry the greatest load with the least amount of material (that is—a ball bearing of ample capacity requires less space than any other type of bearing) they make possible the construction of the lightest weight axle—and thirdly, the use of ball bearings enables us to produce an axle in which

there are no adjustments—because no adjustments are ever required.

Why Sheldon Springs Dominate

For more than fifty years SHELDON has dominated the SPRING-MAKING industry and with perfectly logical reasons. In the first place, the raw material used in SHELDON SPRINGS is compounded over a special formula shown by our years of experience to be the most efficient. And every shipment of this steel is carefully analyzed chemically to insure absolute following of our formula. Sheldon Springs are heat treated in specially constructed furnaces equipped with pyrometers, that by recording exact temperatures eliminate fallible human guess work and insure a uniform product. Even the baths used in the heat treating processes are chemically analyzed, frequently, to keep them in uniform condition.

After the springs are finished they are constantly tested for hardness, toughness, brittleness, bending, tension, twisting, shock and endurance to guarantee the accurate performance of every manufacturing process. All of which superior methods are supplementary to the thought and efforts of unquestionably the finest organization of spring engineers and designers known to the art of Spring-Making.

You who are interested in commercial vehicles should familiarize yourself with SHELDON products for in use they mean the greatest efficiency possible in motor truck construction. We will be glad to discuss personally with anybody any points concerning Sheldon Axles, both front and rear, Sheldon Springs or Sheldon Brake and Radius Rod Equipments.

SHELDON AXLE COMPANY

WILKES-BARRE

Makers of Springs and Axles for Heavy
Duty Service for More Than 50 Years

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Chicago, Peoples Gas Bldg., 122 S. Michigan Blvd.

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18,529 Miles a Year

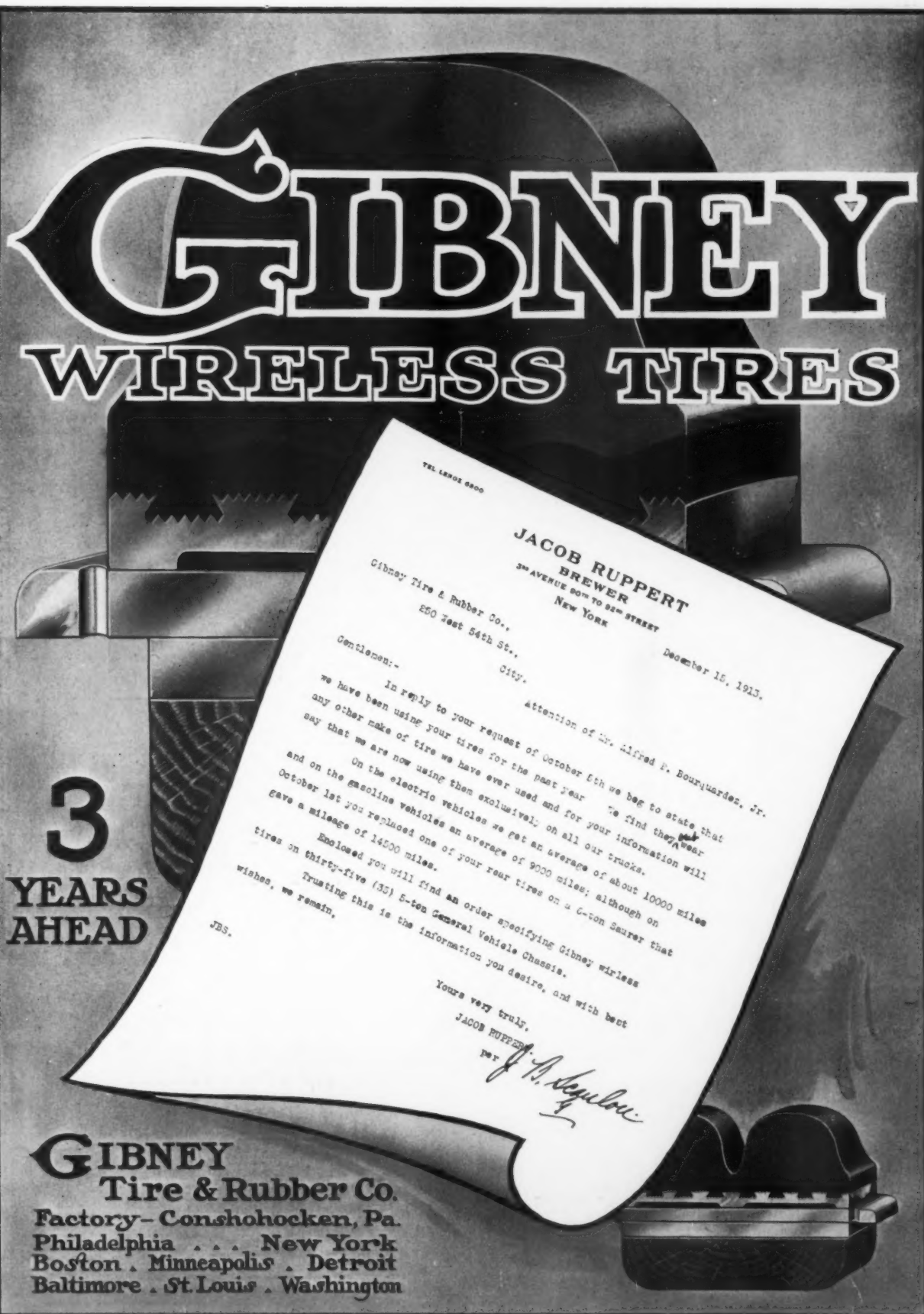
and Less Than \$1 Per Month Battery Maintenance

From Service Report, year ending December 31, 1913, on Edison Battery, Detroit Electric Police Patrol Wagon operated by City of Memphis, Tenn.:

Number of Runs	- - - - -	5,166
Number of Miles	- - - - -	18,529
Cost of tires, chains, grease, etc.	- - -	\$275.30
Cost of Battery, Solution (Total Battery Maintenance)	- - - - -	11.92

The Edison Alkaline Storage Battery in this kind of service is guaranteed to be capable of developing **100 per cent** of its rated capacity at the end of **four** years.

Edison Storage Battery Co.
141 Lakeside Avenue Orange, New Jersey



GIBNEY WIRELESS TIRES

**3
YEARS
AHEAD**

TEL. LEWIS 6500

**JACOB RUPPERT
BREWER**
3rd AVENUE 60th TO 62nd STREET
New York

December 15, 1913.

Gibney Tire & Rubber Co.,
850 West 54th St.,
City.

Gentlemen:-

In reply to your request of October 6th we beg to state that we have been using your tires for the past year and for your information will say that we are now using them exclusively on all our trucks. On the electric vehicles we get an average of about 10000 miles and on the gasoline vehicles an average of 9000 miles; although on October 1st you replaced one of your rear tires on a 6-ton Seaurer that gave a mileage of 14500 miles.

Enclosed you will find an order specifying Gibney wireless tires on thirty-five (35) 5-ton General Vehicle Chassis. Trusting this is the information you desire, and with best wishes, we remain,

YRS.

Yours very truly,
JACOB RUPPERT
per *J. A. Ruppert*

GIBNEY
Tire & Rubber Co.
Factory - Conshohocken, Pa.
Philadelphia . . . New York
Boston . Minneapolis . Detroit
Baltimore . St. Louis . Washington

EISEMANN

Just as additional evidence of the continued supremacy of Eisemann Ignition, especially in the motor truck field, we cite the fact herewith that at the last count of the 83 concerns with whom we have contracts for standard equipment, 50 of them were contracts with motor truck manufacturers.

As we have often repeated, this simply bears out our contention, that where efficiency, dependability and durability count most, there you will find Eisemann most firmly entrenched.

In other words, Eisemann Magnetos are not only a sales asset, but to the manufacturer of motor trucks who must sell on a cost-of-service basis, Eisemann Magnetos are the biggest sort of service asset as well.

So far as the truck field is concerned, the assertion is truthfully made, that no instrument is so particularly adapted as the Eisemann Magneto with automatic spark control. By the very nature of its design and construction, the automatic spark control Eisemann Magneto means more mileage per gallon of gas and oil, and greatly increased life both of engine and car itself.

If you are not familiar with this particular type of Eisemann Magneto, the story will interest you. Won't you send for it?

**Fifty Truck Makers
Now Use Eisemann
Ignition.**

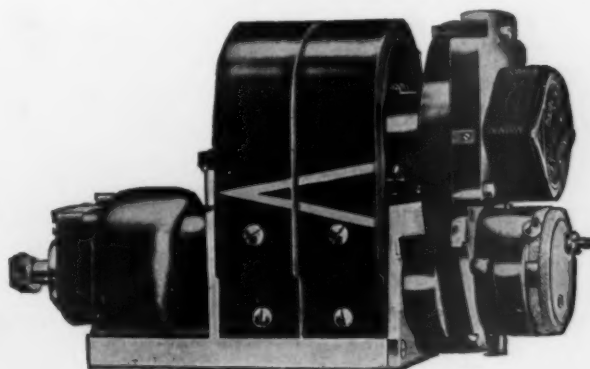
The Eisemann Magneto Co.

Sales and General Offices
32-33d St., Brooklyn, N.Y.

New York
123 W. 52d St.

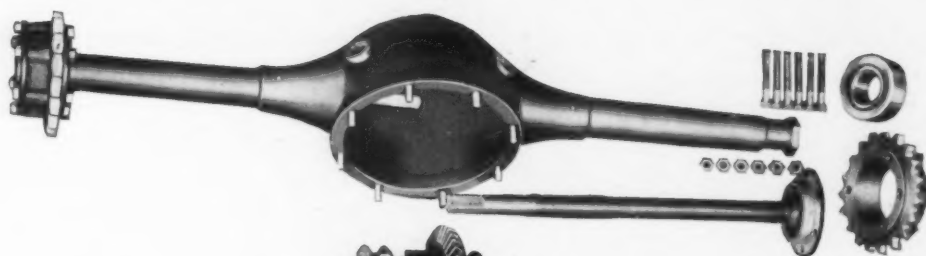
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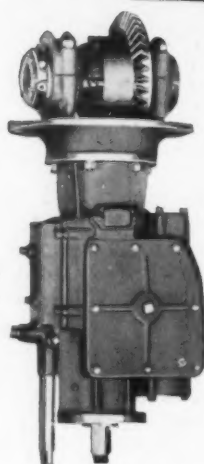


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Russel Jack Shafts

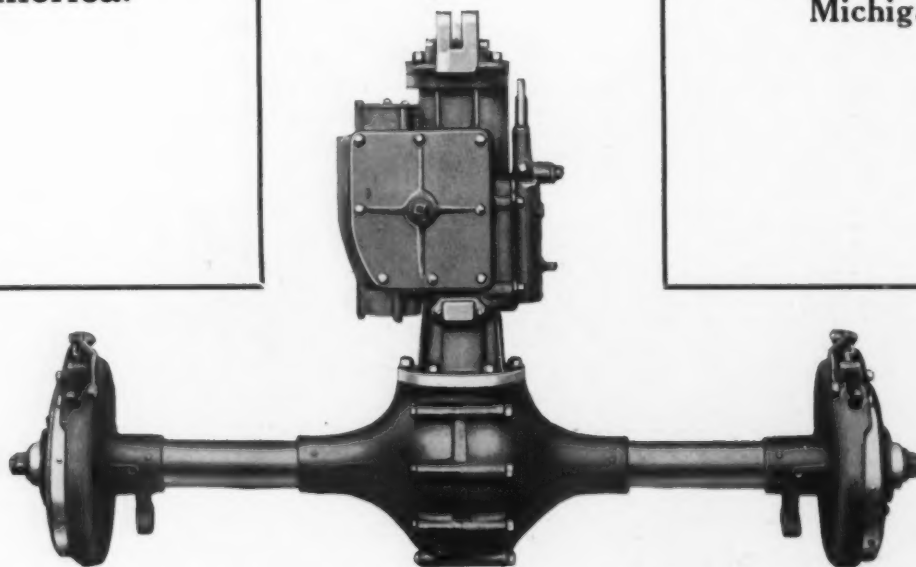


Now used for a majority of the 1 and 1½ ton trucks made in America.



Manufactured
by the
**Russel Motor
Axle Company**

North Detroit
Michigan



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ESTABLISHED 1883.

MANHATTAN STORAGE COMPANY.

SILVER VAULTS

WAREHOUSE

ABSOLUTELY FIRE-PROOF

SEVENTH AVENUE, 52ND & 53RD STS.

97

GENERAL VEHICLE COMPANY, INC.
 LONG ISLAND CITY, NEW YORK
 NEW YORK—CHICAGO—BOSTON—PHILADELPHIA

When Writing, Please Say—"Saw Your Ad. in the C C J"



SPEDOLENE

**Designed Especially for Gears
Transmissions, Differentials, Universal Joints,
Timing Gears, Worm Gears**

"The Lubricant That Kills Heat"

When you purchase "SPEDOLENE" lubricant for gears in motor trucks, you can buy something more than a can or barrel of lubricant. You buy "SPEDOLENE" SERVICE. You buy and you get the best lubricant service that it is possible to secure.

S will positively eliminate gear noises
P will not run out or throw out at axle or drums or gear cases
E will not gum
D will keep the gears cool as well as lubricate them
O will last longer than any oil, grease or compound
L has revolutionized the gear lubrication problem
E has no corrosive action, no fats, grease, acids, lye, soda or water
N is the most economical and efficient lubricant under any temperature
E is the greatest and quickest success in the history of lubrication

"Let Your Truck Be the Judge"

**Used
Extensively in
Foreign
Countries**



Dealers

Write for Quotations and Other Data You Require. We Need an Agent in Every Town, City and State. Literature Descriptive of "SPEDOLENE" Gladly Sent You on Request.

CONTINENTAL ASBESTOS CORPORATION

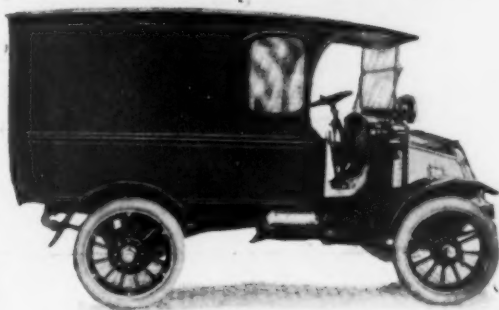
Manufacturers of Asbestos Lubricants, etc.; Spedolene, Journolene, Asbestolene, Cupolene, Axolene and Gearolene

Worcester, Mass., U. S. A.

The KREBS TRUCK

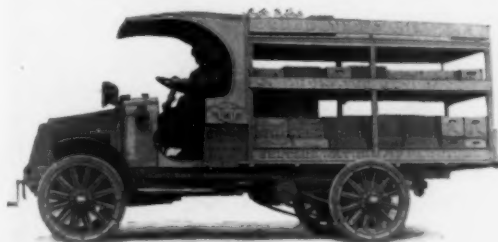
and It's Wonderful Automatic Governor

This Is a Big Money-Making Proposition for Any Live Dealer



Model E, 1 1/2-Ton Truck

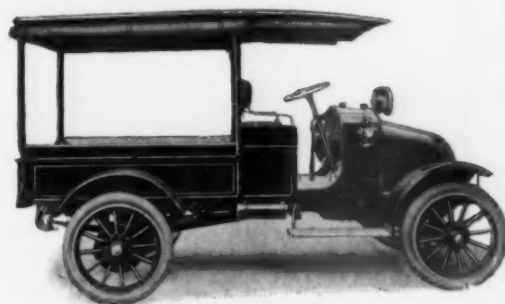
There are various reasons why the Krebs makes this appeal to prospects, but the chief are these: It is of the most useful and popular capacities; its material and construction are of the highest mechanical excellence, hence it is durable and dependable; its price is moderate and its value great; its efficiency and economy are known the country over and it is the only truck having the wonderful Automatic Governor, without which no truck is completely competent.



Model D, 1 1/2-Ton Truck

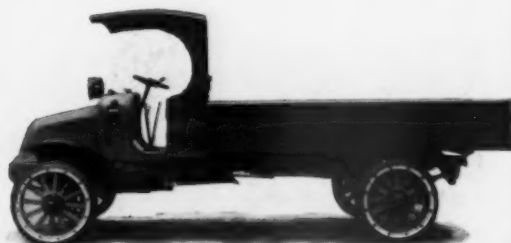
We are extending our selling organization and would like to make dealer connections in territory where we are not now represented. Inquiries are invited from dealers desirous of handling a line of trucks that sell on their merits and are superior to competition. If you can adequately represent such a truck, write us without delay.

There are great selling possibilities in the Krebs, because it offers great delivery possibilities to the buyer. In plain words, you are selling a merchant something he can use to advantage at a price he is willing to pay; that constitutes an ideal selling proposition, and any energetic dealer can make big money with it.



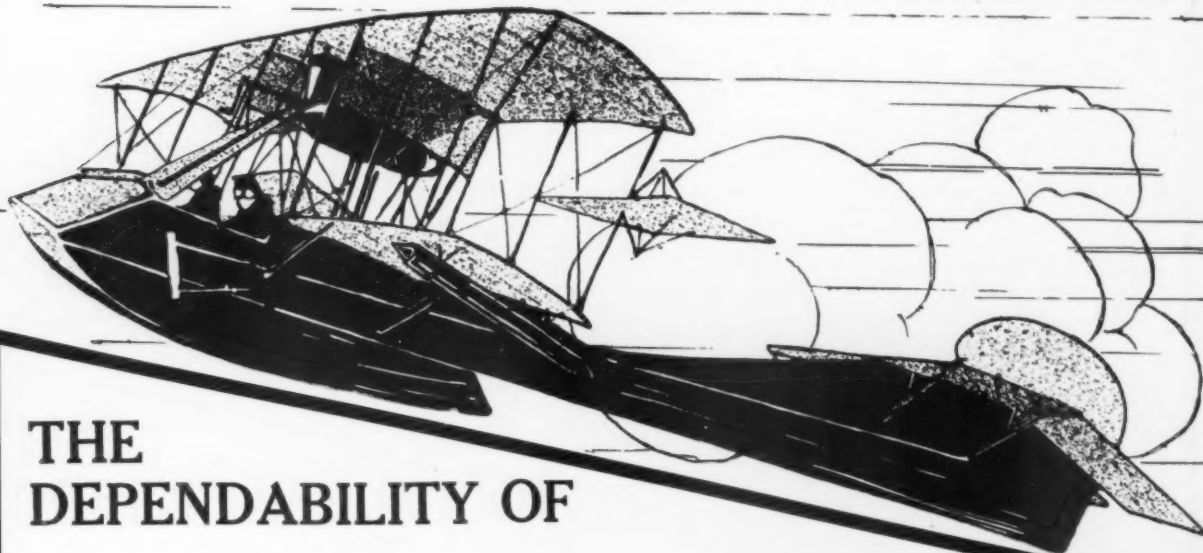
Model AA, 1-Ton Truck

The Krebs line consists of a 1/2-ton shaft-drive, 1-ton chain-drive, 1-ton worm-drive, 1 1/2-ton chain-drive, and 2-ton worm-drive models. Some one of them will be found to meet every possible requirement of the buyer and none can be equalled by any other truck in the character and economy of the service rendered.



Model H, 2-Ton Truck, Worm Drive

THE KREBS COMMERCIAL CAR COMPANY, Clyde, Ohio



THE DEPENDABILITY OF

Packard Cable

An advertisement by a man who *knows* cable

If I were going to be an aviator (which I am not) I should want to know that my engine was right—absolutely. Too many aeroplane fatalities are caused by engine failure. And, remembering that most engine failure results from ignition failure, I'd give particular attention to every piece of ignition apparatus—and surely I would insist on having Packard Cable. Why?—because it's used in about every place where absolutely reliable service **must** be given;—on the high-grade cars, the finest motor boats, the U. S. Navy. Just notice **who** uses it and **where** they use it and it's easy to see **why** they use it.

In my opinion, this quality of dependability is what I want in the cable that goes on **my** car,—not for ignition only, but for starting and lighting as well.

The whole matter can be summed up in one sentence—"It's built to **give a service**, not to meet a price."

Before you do any wiring, write for full information on this cable matter to



Combination High Tension Cable

The Packard Electric Co.
Dept. H
Warren, Ohio

(98)

When Writing, Please Say—"Saw Your Ad. in the C C J"

Advertisers' Index

Adams Bros. Co. 71	DeKalb Wagon Company ... 72	Koehler H. J., S. G. Co. 84	Russel Motor Axle Co. 90
Alma Motor Truck Co.	Durant-Dort Carriage Co.	Krebs Commercial Car Co. 93	Rutenber Motor Co. 76
Front Cover	Flint Motor Wagon Dept. 84		
American Taximeter Co. 81	Edison Storage Battery Co. 87	Lavigne Gear Co. 78	Schwarz Wheel Co. 63
Autocar Co. 2	Eisemann Magneto Co. 89	Lingquist, Wm. A. 82	Selden Truck Sales Co. 73
Baker Motor Vehicle Co. 85	Electric Storage Battery Co. 67	Lippard-Stewart Motor Car Co. 75	Sheldon Axle Co. 86
Bessemer Motor Truck Co. 57	Federal Motor Truck Co. 60	Littleford Bros. 83	Signal Motor Truck Co. 62
Borg & Beck Co. 72	Firestone Tire & Rubber Co. 47	Long Mfg. Co. 72	Spicer Mfg. Co. 79
Bowen Mfg. Co. 75	Freeman, Samuel T & Co. 84	McQuay-Norris Mfg. Co. 70	Splitdorf Electrical Co. 74
Bower Roller Bearing Co. 64	General Motors Truck Co. 61	Mercantile Trust Co. of Illinois 95	Standard Welding Co. 79
Bowser, S. F. & Co., Inc. 71	General Vehicle Co., Inc. 91	MotoKart Co. 80	Stewart Motor Corporation .. 77
Buckeye Jack Mfg. Co. 80	Gibney Tire & Rubber Co. 88	New Departure Mfg. Co. 82	Thermoid Rubber Co. 69
Buda Co. 68	Goodrich, B. F., Co.	Packard Electric Co. 94	Touraine Co. 72
Candler Radiator Co. 71	Inside Back Cover	Packard Motor Car Co. 96	United States Tire Co. 58
Chase Motor Truck Co. 71	Gould Storage Battery Co. 66	Palmer-Moore Co. 77	Van Dorn & Dutton Co. 77
Childs, O. J., Co. 74	Gramm-Bernstein Co. 76	Parish & Bingham Co. 80	Veeder Mfg. Co. 67
Cleveland Worm & Gear Co. 65	Hayes Wheel Co. 78	Pierce-Arrow Motor Car Co. 78	Velie Motor Vehicle Co. 76
Commerce Motor Car Co. 83	Herz & Co. 75	Pierce Speed Controller Co. 85	
Continental Asbestos Corp. 92	Hess-Bright Mfg. Co. 77	Polack Tyre & Rubber Co.	
Cotta Transmission Co. 76	Highland Body Mfg. Co. 73	Back Cover	Waukesha Motor Co. 73
Covert Motor Vehicle Co. 85	Hindley Gear Co. 74	Pyrene Mfg. Co. 69	Wayne Light Commercial Car Co. 66
Cramp, Wm. & Sons, S. & E. Bldg. Co. 83	International Harvester Co.	Reo Motor Truck Co.	Western Drop Forge Co. 83
Croce Automobile Co. 68	of America. 74	Inside Front Cover	White Co. 48a, 48b, 48c, 48d, 48e, 48f, 48g, 48h
Crown Commercial Car Co. 79	Johns-Manville, H. W., Co. 59	Republic Rubber Co. 80	Worcester Pressed Steel Co. 79
Cullman Wheel Co. 65		Ross Gear & Tool Co. 73	
		Rowe Motor Mfg. Co. 75	

Are You Losing Sales?

Why not close *all* truck prospects by the logical selling plan---

PARTIAL PAYMENTS

Too many truck sales are lost or deferred, because the purchaser wants the truck to pay its own way,—and, therefore, wants to buy on the installment plan.

We Discount Truck Paper to Maturity

Write us today for Information

MERCANTILE TRUST COMPANY, OF ILLINOIS

Paid up Capital, \$300,000.00

FIRST NATIONAL BANK BUILDING - - - - CHICAGO

When Writing, Please Say—"Saw Your Ad. in the C C J"

Packard

QUALITY IN MOTOR TRUCKS

Performance on the road is the best evidence of Packard ability to meet the requirements of practically all branches of heavy duty hauling.

Packard trucks are in successful operation in 185 lines of business. Many of these vehicles have been in service for periods longer than five years.

WE ARE THE WORLD'S LARGEST BUILDERS OF MOTOR TRUCKS

From Maine to California, Packard trucks are supplanting was eful methods with system and speed. More than four million dollars worth of Packard trucks were bought in the last fiscal year, and the current year's sales are slated to exceed that figure. Packard trucks are sold at a price consistent with the cost of the finest materials, developed by expert craftsmen under the supervision of specialists in truck design.

2-TON	3-TON	4-TON	5-TON	6-TON
\$2800	\$3400	\$3550	\$4150	\$4300

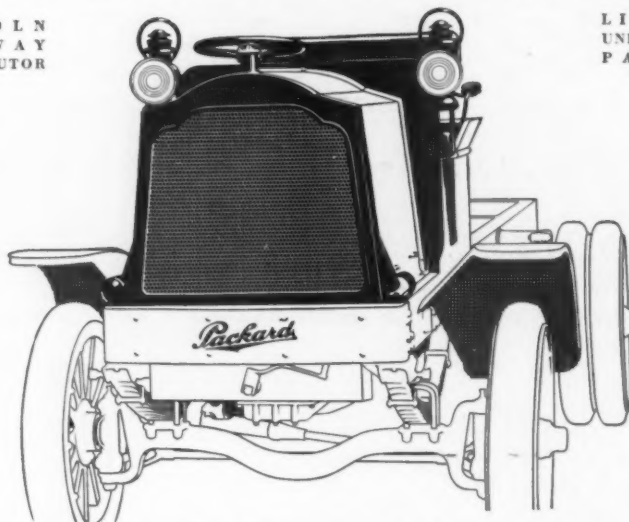
CHASSIS PRICES F. O. B. DETROIT

The Packard truck's ample factor of safety is assurance of uninterrupted operation, which means the maximum dividends from the investment.

In truck operation, final cost is more important than first cost. Our patrons know that the best is the cheapest when you measure the final cost.

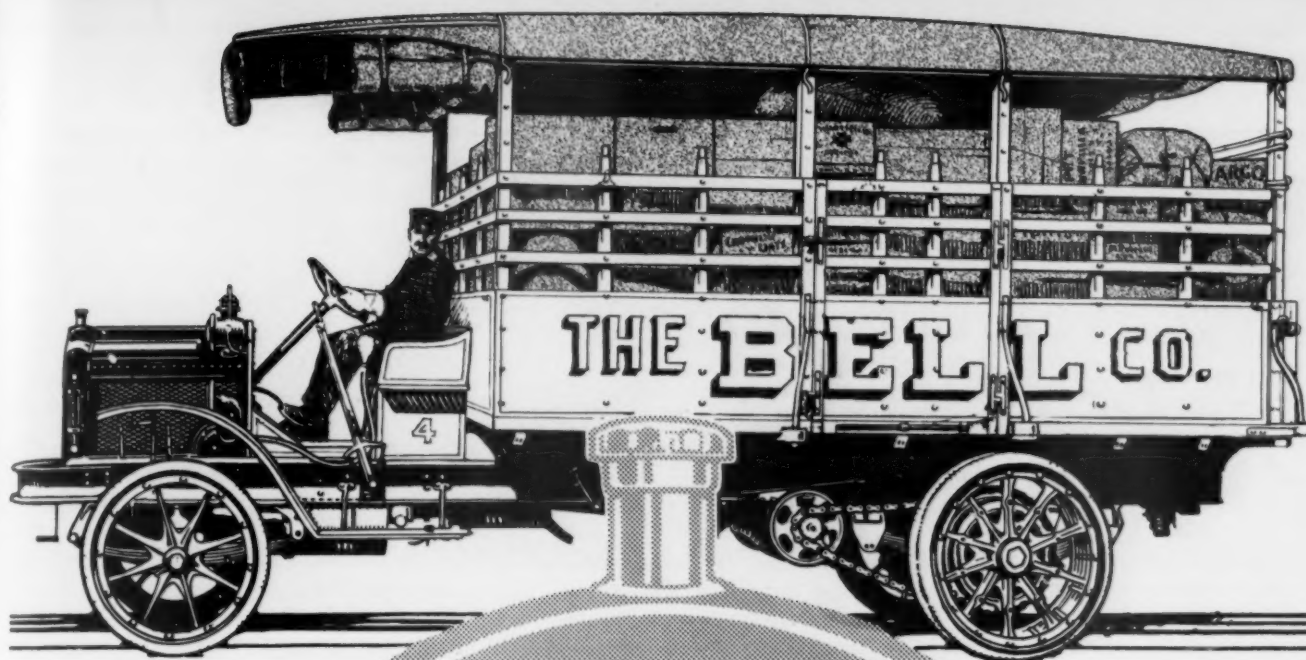
PACKARD MOTOR CAR CO., DETROIT

LINCOLN
HIGHWAY
CONTRIBUTOR



LICENSED
UNDER KARDO
PATENTS

ASK THE MAN WHO OWNS ONE



WHITE MOTOR TRUCKS

IN THE SERVICE OF

WHOLESALE AND RETAIL GROCERS AND DEALERS IN FRUIT AND PRODUCE

In these lines of business the hauling or delivery problem is important and motor trucks are the only satisfactory solution. Motor Trucks not only solve transportation problems but create new advantages which increase and broaden the business of every user.

White Trucks are extensively used by Wholesale and Retail Grocers and Dealers in Fruit and Produce, because the successful service that White Trucks are giving in these and other lines of business makes them the logical choice of careful buyers. White Trucks are made by a success-

ful and responsible manufacturer, having a permanent organization which provides efficient and dependable after-sale service to owners everywhere. White Trucks give the most reliable service, last longest and cost less to operate and maintain. Because of these points of merit there are more White Trucks in service than any other make.

Any company may buy White Trucks and be sure of getting complete satisfaction and the best service from every standpoint. Read what owners in your line of business say about it on the following pages.

Why experiment when others have experimented for you?

THE WHITE  COMPANY
CLEVELAND

*Both in Quantity and Value of Production, the Largest Manufacturers
of Commercial Motor Vehicles in America*

WHITE MOTOR TRUCKS



Fleet of White Trucks owned by the J. B. Blood Company, Lynn, Mass.



White 3-ton Truck owned by the South Bend Wholesale Grocery Co., South Bend, Ind.



White 1½-ton Truck owned by The Bour Co., Cleveland, Ohio



White 1½-ton Truck owned by J. T. Diefenbacher, New Philadelphia, Ohio



White 1½-ton Truck owned by J. R. Thomas' Sons, Youngstown, Ohio

WHAT OWNERS SAY

Three Years Of Good Service

We have had three White Trucks in service for the past three years, and they have given us very satisfactory and efficient service. Before purchasing our motor equipment, we had our engineer investigate carefully the merits of the various trucks, and have not been disappointed in his selection of the White Truck.

We gratefully acknowledge the courtesies extended by your Company in maintaining the service.

Peoria, Ill.

OAKFORD & FAHNESTOCK

The Best Truck

Cleveland, Ohio.

We are using nine White trucks, and it is our opinion that, for our use, your firm makes the best truck.

THE W. P. SOUTHWORTH CO.

Standardize Equipment With White Trucks

We have been using trucks in the wholesale grocery business for the last three years. The first truck we bought was not a White, but we found that we had so much better success with the White that we sold that truck and bought a White and have since added two more to our equipment.

We are very much pleased with the White Truck, and believe it to be the best for our business. Our loads average about 3½ tons, and we are getting seven and eight miles to a gallon of gasoline.

We find that one of the most important things in running trucks is to have a driver who is interested and takes care that the grease cups are filled every morning and that everything is in perfect running order.

Brockton, Mass.

E. C. HALL COMPANY

Lasting Service With Moderate Upkeep

per day last year, was lower than the year previous.

We believe the greatest advantage of motor delivery over horse delivery is the great flexibility of the service rendered by the motor truck. For long hauls and quick delivery, it is unquestionably superior.

Poughkeepsie, N. Y.

There is nothing much that we can add to what we have already said about our White 1½ ton truck.

It has now been in service about three years and is doing everything we could expect of it. Our repair bills are moderate, and our total cost

per day last year, was lower than the year previous.

We believe the greatest advantage of motor delivery over horse delivery is the great flexibility of the service rendered by the motor truck. For long hauls and quick delivery, it is unquestionably superior.

WM. T. REYNOLDS & CO.

Cheaper, Quicker and More Satisfactory

more satisfactory and also a good advertisement.

This truck has been on the streets every day, except Sundays and holidays, for the past two years, and has never been in the shop with the exception of January last, when we were having it cleaned up and painted. We examined it thoroughly and found gearing and all parts of the machine in elegant condition; the power and speed of the truck seem to be as good as the first day we put it out.

We can say that any one wanting a truck for delivery purposes makes no mistake when he buys a White.

Zanesville, Ohio.

THE ZANESVILLE FRUIT CO.

White Owners Continue To Buy White Trucks

5-ton White—which we think speaks for itself. We now have three White Trucks in constant use. The cost of operating a 5-ton White is as low as it is possible to run any truck, and we know that the service we secure is as efficient as possible.

We also assure you that we are well satisfied with the way you treat us when making repairs, etc. and we find you just and reasonable in your charges on same.

Hoboken, N. J.

HOLLSTEIN BROS.

THE WHITE  COMPANY

WHITE MOTOR TRUCKS



Part of a fleet of eight White Trucks owned by The W. P. Southworth Company, Cleveland, Ohio

WHAT OWNERS SAY

Delivery Impossible Without White Truck

The next question of importance in the advantage of motor truck delivery in our business is the time we can make in getting over the ground. Tacoma is spread over a big area of ground and it would be almost impossible for us to serve our trade without the White Truck.

Tacoma, Wash.

We have run our White Truck now about eight or nine months and it has given us very good

satisfaction. The next question of importance in the advantage of motor truck delivery in our business is the time we can make in getting over the ground. Tacoma is spread over a big area of ground and it would be almost impossible for us to serve our trade without the White Truck.

LINDBERG GROCERY CO.

Four Years Of Satisfaction

My only regret is that business does not warrant my using more than I have, as they are certainly a great assistance to anyone in the retail lines where promptness in deliveries is a great factor.

New York, N. Y.

FRANK W. BRUNS

Trucks Cover 1100 Miles Monthly

They have run each about 1100 miles monthly at a very reasonable expense and seem to be in as good condition as when new. They cover territory impossible with the horses they replaced, and our customers are much better pleased with our promptness in delivering orders. So far as we have observed, the White Trucks give more efficient service than those of any other make, and have our hearty recommendation.

Tacoma, Wash.

McLEAN-McMILLAN CO.

Delivery Cost Cut In Half

Many of our hauls are long and some over very bad roads. With our 3-ton truck we are able to haul in one load, more than two horse-drawn trucks could carry.

Considering the total cost of operation and a liberal allowance for depreciation, our cost of delivery has been cut in half. We consider this quite an item.

Our confidence in our White Truck is growing every day, because we find that it is reliable and can be depended on to get there and get back. We assure you that when we are again in the market for a truck it will be a White.

Our confidence in our White Truck is growing every day, because we find that it is reliable and can be depended on to get there and get back. We assure you that when we are again in the market for a truck it will be a White.

Akron, Ohio.

THE ACME CASH STORES



White 1 1/2-ton Truck owned by Tony Lamantia, Chicago, Ill.



One of the two White Trucks owned by Wilkinson, Gaddis & Co., Newark, N. J.



White 5-ton Truck owned by J. B. Tompkins & Sons, New York City



One of the nine White Trucks owned by the Pacific Fruit & Produce Co., Portland, Ore.



White 3-ton Truck owned by The Matthew Smith Tea, Coffee and Grocery Co., Cleveland, Ohio



White 1 1/2-ton Truck owned by the Capt. Post Horseradish & Pickle Co., New York City



White 5-ton Truck owned by F. J. Shannon & Co., Yonkers, N. Y.



White 3-ton Truck owned by the C. B. Witt Co., Tampa, Fla.

THE WHITE  COMPANY

WHITE MOTOR TRUCKS



Part of a fleet of eight White Trucks owned by The Bell Company, Philadelphia, Pa.



Part of a fleet of three White Trucks owned by the W. M. Hoyt Co.,
Chicago, Ill.



Fleet of White Trucks owned by the McLean-McMillan Co., Tacoma, Wash.



One of the eight White Trucks owned by The Bell Co., Philadelphia, Pa.

WHAT OWNERS SAY

It Pays To Buy White Trucks

from two to three teams. The expense in keeping the truck in order has been very light. Previous to getting this truck we had one of a cheaper make, but considered it wise to get one of the best.

From experience we would not purchase anything but a White Truck.
Strathroy, Ontario. JOHN IVON

JOHN IVOR & SON

White Truck Eliminates Freight Expense

White Truck Eliminates Freight Expense I am more than pleased with my White Truck. It easily does the work of three teams and I am now delivering to customers forty miles in either direction from my store, to whom I formerly shipped by freight, saving them cartage and myself the cost and trouble of packing. As for cost of operation, my 3-ton White uses less gasoline than my 2-ton truck of another make, and, last but not least, the engine is so simple that it is "fool proof."

Brooklyn, N. Y.

PETER MEYER

PETER MEYER

Trucks Reach New Territory

Trucks Reach New Territory

The motor truck has made it possible for us to extend our business into territory that formerly was beyond the reach of our horse-drawn vehicles. The trucks have also speeded up our delivery service.

We believe that the White Truck is as near perfection mechanically as any truck on the market. All our machines are $\frac{3}{4}$ -ton capacity with open screen bodies.

Cincinnati, Ohio. **OSCAR SCHLENCK**

OSCAR SCHLENCK

Praise For White Inspection Service

Regarding our White Truck, would say that it gives us great pleasure to talk about the service which we have had with our truck.

We have twenty-one stores in Cleveland, and our truck is making the rounds of these stores about three times a week, as well as hauling all of our freight to the warehouse. The truck has been running every day since we put it on in January and has never been laid up for repairs.

We also wish to speak about your inspection service, which we believe has a great deal to do with keeping the truck in first class order.

Cleveland, Ohio.

THE MATTHEW SMITH
TEA, COFFEE AND GROCERY CO.

White Truck a Sound Investment

White Truck a Sound Investment

We have now had three years of splendid every-day service and satisfaction from our $\frac{3}{4}$ -ton White Truck. The housewives to-day like quick service and demand it, so we use motor trucks exclusively.

We bought a White for the same reason we have always bought hand-made wagons. We get more lasting service, less depreciation and in the end a better price for our used wagons.

We consider a White Truck a sound investment and a splendid advertisement for a live grocery business.

Cleveland, Ohio.

JOHN F. SCHULTE

JOHN F. SCHULTE

THE WHITE  COMPANY

WHITE MOTOR TRUCKS



Part of a fleet of three White Trucks owned by the Acme Tea Company, Philadelphia, Pa.

WHAT OWNERS SAY

White Trucks Promote Good Service

We have been using one of your White Trucks for about a year and a half, and are more pleased with its service to-day than when we received it. Of all the good features of your truck the one that appeals to us most is the efficient service we are able to give our customers in the way of prompt deliveries. This we consider the strongest argument in favor of motor delivery.

Massillon, Ohio.

THE C. L. McLAIN COMPANY

White Trucks Have a Reputation For Service

I selected the White Truck on account of its reputation for service. I have used it for a number of months with perfect satisfaction.

Washington, D. C.

N. H. SHEA

White Trucks Build Business

We have nothing but praise for the White Truck and the work it has done for us. We have built up a prosperous suburban business, which it would be impossible to do with horses. We intend to purchase another truck within a month or two to meet the demands of our increasing business.

Brockton, Mass.

BROCKTON PRODUCE CO.

Gasoline and Oil the Only Expense

We purchased one of your 3-ton White Trucks the first of last July, and have had same in service ever since, and have never lost a day's use of same since we have had it.

Our upkeep on this truck has been practically nothing outside of the usual expenses for oil and gasoline. We average about twenty-five miles a day in the city, beside using this truck four times a week to make deliveries in suburban towns.

We are well pleased so far with this truck and would recommend same to any groceryman figuring on purchasing trucks.

Steubenville, Ohio.

THE MOSEL-JOHNSON COMPANY

White Owners Are Satisfied Owners

It is with great pleasure that we recommend to any prospective buyer your White Truck. We have been operating one of your $\frac{3}{4}$ -ton trucks for the past seven months, and up to the present time have not had one cent of expense aside from our operating cost. The showing is remarkable in view of the fact that we cover not less than 50 miles a day.

Los Angeles, Cal.

M. A. NEWMARK & COMPANY

Does Work of Three Teams

A little over a year ago, I purchased a White Delivery Truck through your agency in this city. I wish to say that I am entirely satisfied with the truck. Have run it every day, except Sundays, and have not had any expense for repairs.

It does the work of three teams and is much cheaper, and more satisfactory for one engaged in the grocery business like myself.

Before purchasing the truck, I tried a number of different makes of delivery trucks, and I can truthfully say that I am not sorry that I purchased a White Delivery Truck. I recommend the White to all who are contemplating the purchase of a good motor truck.

Joplin, Mo.

G. W. KOEHLER



Part of fleet of four White Trucks owned by the W. E. Drislane Co., Albany, N. Y.



Fleet of White Trucks owned by Hollstein Bros., Hoboken, N. J.



White 3-ton Truck owned by The Mosel-Johnson Company, Steubenville, Ohio

THE WHITE  COMPANY

WHITE MOTOR TRUCKS



Part of a fleet of seven White Trucks owned by Michaud Bros., Inc., St. Paul, Minn.



White 1 1/2-ton Truck owned by Wm. T. Reynolds & Co., Poughkeepsie, N. Y.



White 1 1/2-ton Truck owned by the Randolph Market & Grocery Co., Chicago, Ill.



White 3/4-ton Truck owned by Thomas & Howard, Durham, N. C.



White 3-ton Truck owned by the Macon Grocery Co., Macon, Ga.

WHAT OWNERS SAY

White Truck Best By Comparison

About a year ago we purchased one of your 1 1/2-ton trucks, equipped with pneumatic tires, which has proven satisfactory in every way. We consider the White Truck of this capacity, for our use, far ahead of any truck that we have had any experience with and should we need more would not hesitate in ordering another White.

They are very economical to run, and our expense for the first year has been practically nothing, besides the excellent service given by your agents.

Holyoke, Mass. HENRY G. SEARS COMPANY

Excellent Results On Long or Short Hauls

We have been running a White 3-ton Truck for nearly a year now, and must say it has given us entire satisfaction in every respect.

Furthermore, it has not cost us a cent for repairs during this period and is, we consider, in as good shape today as it was the first day we received it.

We have a sixteen-mile haul here that formerly took a team the full day, whereas now we can make this trip in a shade less than two hours and at less cost than it took with a team.

On a half-mile haul or more the motor truck is so much superior to a team that there is no comparison and we have often wondered why we did not purchase a motor truck years ago.

THE RILEY-RAMSEY CO., LIMITED
Port Arthur, Ont.

Three Years Service No Repair Bills

My 3/4-ton White Truck has been entirely satisfactory. This is the third season for my truck and it has cost practically nothing for mechanical repairs.

The most important advantage of motor delivery is in long trips. I have three trips, and kept four horses for that part of the business and it took about all their time. The truck does the same work, does it cheaper, and has time to spare for other deliveries, and I don't have that feeling, "Is it too tired."

Wilkes-Barre, Pa.

W. D. BEERS

White Trucks Cheapest In The Long Run

We are very much in favor of White Trucks, because they are reliable and dependable. Our truck does more work, and is quicker than any other method we know of.

After trying other cars we are convinced that White Trucks are cheapest in the long run; less repairs and smaller upkeep.

Seattle, Wash.

HARRAH BROS.



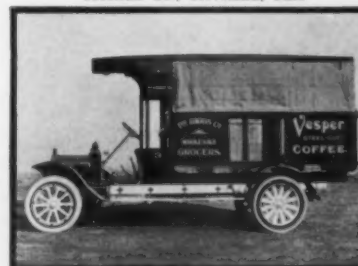
White 3-ton Truck owned by The Acme Cash Stores, Akron, Ohio



White 3/4-ton Truck owned by John F. Schulte, Cleveland, Ohio



White 3/4-ton Truck owned by The Herrman-McLean Co., Cleveland, Ohio



One of the three White Trucks owned by The Riggs Co., East Liverpool, Ohio

THE WHITE  COMPANY

WHITE MOTOR TRUCKS



Fleet of White Trucks owned by the E. C. Hall Co., Brockton, Mass.



White 1 1/2-ton Truck owned by Fleming Bros., Chicago, Ill.



White 1 1/2-ton Truck owned by Palermo & Insirillo, Beaumont, Texas



White 3/4-ton Truck owned by W. H. Kane, St. Paul, Minn.



White 1 1/2-ton Truck owned by Rich & Evertsen, Albany, N. Y.

WHAT OWNERS SAY

White Truck Will Go Anywhere

We are satisfied that there is no truck made in the United States that will go where the White Truck will go. We have tried our truck in the very highest mountain country that any machine has ever attempted to go.

Last year we went into the head of Provo Canyon on a fishing trip, and we went over some of the worst country that anyone has tried to go with a machine and we never got stuck. We also went into Fort Bridger Country, in Wyoming. We travelled up some hills that we don't believe any other machine could go over and we had a good, heavy load on this truck.

We recommend the White Truck for any firm that wants a truck that will go anywhere that they want to take a load.

HANCOCK BROTHERS FRUIT CO.

Salt Lake City, Utah.

Two Years of Good Service

us perfect satisfaction. The upkeep on them so far is nothing.

Durham, N. C.

We have been using two of your White Trucks for nearly two years, and they have given

THOMAS & HOWARD CO.

Always Ready For Work

not do without it. Its greatest advantage to me is that it is always on the job and enables me to give my patrons prompt and effective service, which is appreciated.

Belfast, Me.

BEN D. FIELD

Inspection Service Keeps Trucks In Condition

The White 1 1/2-ton truck, purchased from you about one year ago, has been giving us excellent service. Your inspection service has kept the truck in running condition practically without interruption.

Youngstown, Ohio.

J. R. THOMAS' SONS

White Trucks Are Economical and Efficient

so far as our experience and knowledge goes, we consider them the very best car on the market when it comes to economy and efficiency, the expense of up-keep, and the minimum amount of gas and oil required to operate as compared with others.

Salisbury, N. C.

OVERMAN & COMPANY



One of the six White Trucks owned by The Chandler & Rudd Co., Cleveland, Ohio



One of the three Trucks owned by Lewin DeGroff & Son, New York City



White 1 1/2-ton Truck owned by R. R. Anderson, Chicago, Ill.



White 3/4-ton Truck owned by R. Harvey & Co., Pittsburgh, Pa.

THE WHITE  COMPANY

WHITE MOTOR TRUCKS

SOME OF THE WHOLESALE AND RETAIL GROCERS AND DEALERS IN FRUIT AND PRODUCE WHO OWN WHITE TRUCKS

E. A. Aaron & Brother	Chicago, Ill.	Kreimeier Brothers	Pittsburgh, Pa.
The Acme Cash Stores	Akron, Ohio	Tony Lamantia	Chicago, Ill.
Acme Tea Company	Philadelphia, Pa.	Levering Coffee Company	Baltimore, Md.
Herman H. Adams	Pittsburgh, Pa.	W. J. Lewis & Brother	Pittston, Pa.
O. Affolter & Son	New Philadelphia, Ohio	Lindberg Grocery Company	Tacoma, Wash.
R. R. Anderson	Chicago, Ill.	A. Lango & Company	Peterboro, Ont.
Anthony's Brothers Company	Marblehead, Mass.	McKinney & Company	Binghamton, N. Y.
Apple Land & Orchard Company	Hood River, Ore.	The C. L. McLain Company	Massillon, Ohio
The C. L. Bailey Grocery Company	Marietta, Ohio	McLean-McMillan Company	Tacoma, Wash.
J. J. Barnes-Fain Company	Atlanta, Ga.	McQuaid Market House Company	St. Paul, Minn.
O. C. Bateman	Byron, Ga.	The A. Macdonald Company	Edmonton, Alberta
W. D. Beers	Wilkes-Barre, Pa.	Macon Grocery Company	Macon, Ga.
Beggs Grocery Company	Sioux City, Iowa	J. H. & F. A. Mead, Inc.	Albany, N. Y.
The Bell Company	Philadelphia, Pa.	Peter Meyer	Brooklyn, N. Y.
J. B. Blood Company	Lynn, Mass.	Michaud Brothers, Inc.	St. Paul, Minn.
Blue Ribbon Company, Ltd.	Winnipeg, Man.	J. A. Minst	Albany, N. Y.
L. Bonito	Venice, Cal.	C. B. Mooney	Hernando, Miss.
Boston Fruit Company	Concord, N. H.	The Morey Mercantile Company	Denver, Colo.
Rocco Borzillo	Norristown, Pa.	The Mosel-Johnson Company	Steubenville, Ohio
Frank Bova	Sewickley, Pa.	J. F. Murzante	Glen Cove, N. Y.
Brockton Produce Company	Brockton, Mass.	Joseph M. Napier & Company	Macon, Ga.
J. P. Brogan	Cleveland, Ohio	National Grocery Company	Seattle, Wash.
Frank W. Bruns	New York City	M. A. Newmark & Company	Los Angeles, Cal.
E. Burger	Rockaway Beach, N. Y.	V. G. Nottoli	Chicago, Ill.
Butte Potato & Produce Company	Butte, Mont.	The Nuway Company	Chicago, Ill.
Campbell, Wilson & Horne, Ltd.	Calgary, Alberta	Oakford & Fahnestock	Peoria, Ill.
Captain Cooke Coffee Company, Ltd.	Kealahakua, Hawaii	Overman & Company	Salisbury, N. C.
Capt. Post Horseradish & Pickle Co.	New York City	Pacific Fruit & Produce Company	Tacoma, Wash.
Casseb Brothers	San Antonio, Texas	Albert Palda	Cleveland, Ohio
The Chandler & Rudd Company	Cleveland, Ohio	Ralph Raffaelly	Franklin, N. H.
D. Christie	Muskegon, Mich.	Parker Ranch	Kamuela, Hawaii
G. C. Cornwell & Sons, Inc.	Washington, D. C.	Pearson Page Company	Portland, Oregon
Cummings & Cummings	New Bedford, Mass.	Pennington Grocery Company	Ardmore, Okla.
Henry Daub & Son	Crafton, Pa.	The Postum Cereal Company	Battle Creek, Mich.
C. M. Decker & Brothers	Montclair, N. J.	L. F. Priest	West Acton, Mass.
Lewis DeGroff & Son	New York City	Randolph Market & Grocery Company	Chicago, Ill.
J. T. Diefenbacher	New Philadelphia, Ohio	T. S. Reed Grocery Company	Beaumont, Texas
Dore-Redpath Company	St. Paul, Minn.	Estate of John Repp	Glassboro, N. J.
W. E. Drislane Company	Albany, N. Y.	William T. Reynolds & Company	Poughkeepsie, N. Y.
E. H. Emery Company	Ottumwa, Ia.	The Riggs Company	East Liverpool, Ohio
Richard T. Evertsen	Albany, N. Y.	The Riley-Ramsey Company, Ltd.	Port Arthur, Ont.
Benjamin D. Field	Belfast, Me.	George J. Sampson	Plymouth, Mass.
Leo W. Fischman	Chicago, Ill.	Santiago Orange Growers' Assn.	Orange, Cal.
Fleming Brothers	Chicago, Ill.	H. C. Schaefer	New York City
J. J. Foster	River Falls, Wis.	Oscar Schlenck	Cincinnati, Ohio
N. J. Gervais	Southbridge, Mass.	Andrew Schock Grocery Company	St. Paul, Minn.
Narcisco Giannini	Chicago, Ill.	E. Schoenberger & Sons	New Haven, Conn.
W. N. Gleason Company	Worcester, Mass.	John F. Schulte	Cleveland, Ohio
J. P. Graves	Spokane, Wash.	Henry G. Sears Company	Holyoke, Mass.
E. C. Hall Company	Brockton, Mass.	C. H. Seavey	Highland, Cal.
Hammond & Company	Tacoma, Wash.	F. J. Shannon & Company	Yonkers, N. Y.
Hancock Brothers Fruit Company	Salt Lake City, Utah	N. H. Shea	Washington, D. C.
Harrah Brothers	Seattle, Wash.	Alexander Sheppard & Sons	Philadelphia, Pa.
R. Harvey & Company	Pittsburgh, Pa.	A. B. Small Company	Macon, Ga.
The Herrman-McLean Company	Cleveland, Ohio	Smith Brothers & Burdick Company	Davenport, Ia.
H. Hicks & Son	New York City	The Matthew Smith Tea, Coffee & Grocery Co.	Cleveland, Ohio
W. T. Hill	Peach, Wis.	South Bend Wholesale Grocery Company	South Bend, Ind.
P. G. Hilliard	Northboro, Mass.	The W. P. Southworth Company	Cleveland, Ohio
J. W. Hjorth	St. Paul, Minn.	Jordon, Stabler Company, Inc.	Baltimore, Md.
Geo. H. Holden & Company	Swampscott, Mass.	Tacoma Grocery Company	Tacoma, Wash.
Hollstein Brothers	Hoboken, N. J.	Thomas & Howard Company	Columbia, S. C.
Honolua Ranch	Honolua, Hawaii	J. R. Thomas' Sons	Durham, N. C.
Hooper, McGraw & Company	Baltimore, Md.	Tolerton & Warfield Company	Youngstown, Ohio
Charles R. Horrie	Chicago, Ill.	J. B. Tompkins & Sons	Sioux City, Iowa
W. M. Hoyt Company	Chicago, Ill.	Tubbesing & Nelson	New York City
S. A. Huber Sons	Chambersburg, Pa.	United Meat & Grocery Company	St. Paul, Minn.
H. J. Hughes Company	Omaha, Neb.	Estate of J. R. Vosekamp	New York City
John Ivor & Son	Strathroy, Ont.	Edward Wagner	Pittsburgh, Pa.
Theodore J. Jansen	Chicago, Ill.	Warfield, Pratt, Howell Company	Wheeling, W. Va.
W. H. Kane	St. Paul, Minn.	West Coast Grocery Company	Des Moines, Iowa
Kauffman & Krueger	Sioux City, Ia.	Wilkinson, Gaddis & Company	Tacoma, Wash.
Kellogg & Company	Richmond, Ky.	T. F. Williams	Newark, N. J.
The Kennewig Company	Cumberland, Md.	C. B. Witt Company	Hillyard, Wash.
P. C. Knowlton Company	Memphis, Tenn.	Wolferman Grocery Co.	Tampa, Fla.
H. Koch & Company	Newark, N. J.	Yakima Orchard Securities	Kansas City, Mo.
G. W. Kochler	Joplin, Mo.	Young & Germany	North Yakima, Wash.
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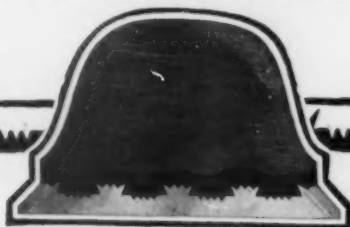
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